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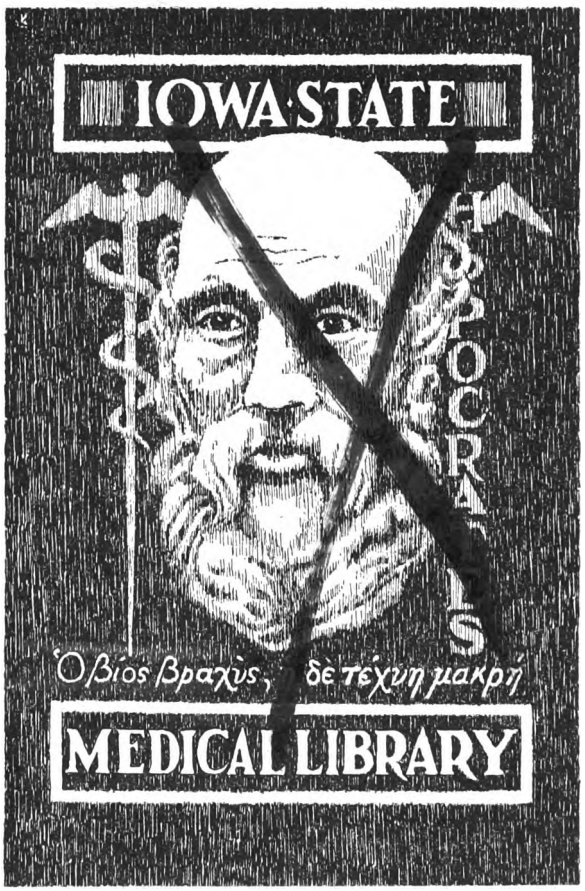

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ASSISTANT SURGEON TO GUY'S HOSPITAL, LONDON, AND CODIRECTOR OF THE MASTITIS CLINIC

In 1937 a clinic for the investigation and treatment of chronic mastitis was established at Guy's Hospital by Dr. P. M. F. Bishop and myself; we later received valuable help from Mr. P. W. Clarkson. This clinic has been attended by 212 patients with pain or with lumpiness in the breast or with both symptoms. We were at first exercised to define "chronic mastitis," but I have not been able to substitute a better definition than what I suggested in a Hunterian lecture two years ago—namely, "pain or lumpiness of the breast not due to bacterial inflammation, new growth, or fat necrosis" (Atkins 1938). This definition has the one advantage that it frankly proclaims our ignorance of the nature of this disorder, and by adopting it we were able to start our inquiries unimpeded by any preconceived theory.

DEFINITIONS

Early in our investigation it became clear that slight periodic pain in the breast and lumpiness sufficient to distinguish the breast from the surrounding subcutaneous tissue were commonly encountered in patients who never complained of their breasts. We concluded therefore that the presence of these two symptoms did not necessarily imply abnormality. Our definition of chronic mastitis thus tended to be confused until we realised from our microscopical studies that there was no definite distinction between the normal breast and the breast affected with chronic mastitis, the one merging imperceptibly into the other. A definition, therefore, of chronic mastitis which makes such a distinction is undesirable and in fact impossible. In practice we use the term "chronic mastitis" to indicate pain or lumpiness in the breast of sufficient degree to bring the patient to the doctor. This implies that there are women experiencing these two symptoms who, because of fear of cancer or from some other psychological cause, attend the mastitis clinic when their more phlegmatic sisters with breasts similarly affected stay away. Thus a mastitis clinic becomes to some extent the resort of the apprehensive and the mentally unstable, and in assessing the effect of any therapeutic remedy it is especially important to take the psychological element into account.

Throughout this investigation I have borne in mind the possibility of subdividing chronic mastitis into different groups, as was attempted by Cheatle and Cutler (1931). I have not, however, felt justified in differentiating "mazoplasia" from "chronic cystiphorous epithelial hyperplasia" either from our clinical or from our limited histological studies. The distinction drawn by Dawson (1933, 1934) between "epitheliosis" and "adenosis" has been of value in clarifying my idea of the histology of this disease, but I have found that these two changes tend to occur together; hence they do not seem to me to express separate clinical entities. Accordingly we determined to investigate the treatment of the painful nodular breast as a whole, re-examining first the claims of those therapeutic agents which had acquired a reputation for alleviating this disease.

The substances which we investigated were studied from the clinical and, as regards œstrogens and androgens, the histological aspects. In observing the clinical effect of any therapeutic agent, and to eliminate the psychological aspect as far as possible, it was our routine practice in the first place to administer some inert substance, either by mouth or by injection, depending on the method it was intended to adopt subsequently when an active principle was substituted. Thus 31 patients were relieved during the preliminary control period, and these must have consisted largely of those in whom the psychological element predominated and, to a small extent perhaps, of patients in whom the disease underwent a spontaneous cure during the control period. These patients received no further treatment.

EFFECT OF PREGNANCY

While under observation 6 patients became pregnant. In 4 of them all symptoms disappeared between the fifth and sixth months; 1 of these 4 had had mastitis for many years, and a previous pregnancy had caused the symptoms to disappear for about eighteen months; 1 patient was not relieved of her symptoms by the pregnancy; and 1 did not attend the clinic after the tenth week and cannot be traced.

EFFECT OF ŒSTROGENS

We first examined the effect of œstrogens prescribed as œstradiol benzoate given by injection or the synthetic substance stilbœstrol given by mouth. In 1937, when these investigations began, œstrogens were still commonly employed in the treatment of this disease, particularly in America. Patients receiving œstrogens were divided into two groups:

Class 1, receiving less than 80 mg. of œstradiol benzoate by injection in four weeks or 280 mg. of stilbœstrol by mouth in eight weeks.

Class 2, receiving 80 mg. of œstradiol benzoate in four weeks or 280 mg. of stilbœstrol in eight weeks, together with those receiving higher doses or equivalent doses for longer periods.

Class 1 contained 14 patients; these were investigated from the clinical point of view only (table I). In 7 patients there was no change; 4 became worse, and 3 improved. Class 2 contained 19 patients, of whom some were investigated histologically as well as clinically (table II). In 7 of these patients there was no change in the clinical picture; 11 became worse; and in 1 the pain improved but the lumpiness persisted. We concluded therefore that œstrogens were harmful in doses sufficiently large to be effective, and that the larger the dose the more harmful the effect.

Histological effect.—The technique employed in assessing the histological effect of œstrogens was as follows. During the preliminary control period a piece of tissue was removed from the breast under local anæsthesia. This biopsy was performed in an area of the breast where the pain or lumpiness was most evident; if there was a definite lump, a part was removed. A course of œstrogens was then given, and a second biopsy was performed at the end of the course, a piece of breast tissue being taken about ½ in. away from the scar of the first biopsy. In this way it was hoped that the histology of the second piece of tissue removed would not be complicated by the scar from the first operation. This method has the disadvantage that the histological structure of the breast is not uniform, and two areas of breast tissue separated only by ½ in. may have entirely different appearances. Further, since the structure of the breast varies with the menstrual cycle, the second specimen was taken at an interval of four or eight weeks after the first, to ensure that biopsies were performed as far as possible at similar stages in the cycle. The histological effect of a therapeutic agent could be assessed by this method only if the same type of differences between the first and second specimens was found in many cases—13 patients receiving large doses of œstrogen were examined in this way.

The histological features which were specifically studied were: (1) the number of glandular systems in any field (adenosis); (2) the degree of epithelial proliferation within those systems (epitheliosis); and (3) the average size of the lumina of the ducts, the degree of desquamation, and the presence of "pale cells," "pale-celled papillomata," and true papillomata. The fibrous tissue was also examined, and the special points noted were: (1) the degree of differentiation between the periacinous and the subepithelial connective tissue; (2) the fibroblastic activity, as judged by the proportion of active fibroblasts; and (3) the presence or absence of œdema.

In 7 cases no change was found in the degree of adenosis. In 6 cases adenosis was thought to be increased. In 8 cases there was no appreciable difference in epitheliosis between the two sets of sections. In 5 cases epitheliosis was considered to be slightly increased after the administration of œstrogen. There was no characteristic difference either in the average size of the

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TABLES I AND II—PATIENTS RECEIVING SMALL AND LARGE DOSES OF OESTROGENS

I—SMALL DOSES

Symptoms	No. of cases	Site	No. of cases	Results
(A) Lumpiness and pain	10	BL	6	Both symptoms worse
				No effect
		UL	4	Both symptoms better
				Pain better
				Both symptoms worse
				No effect
(B) Lumpiness only	1	UL	1	No effect
(C) Pain only	3	BL	1	Worse
		UL	2	Improved
				No effect

II—LARGE DOSES

No. of cases	Symptoms	No. of cases	Site	No. of cases	Results	No. of cases
2	(A)	9	BL	2	Both symptoms worse	1
4					No effect	1
1			UL	7	Pain worse, lump same	3
1					Pain better, lump same	1
1					Both symptoms worse	2
1					No effect	1
1	(B)	1	UL	1	No effect	1
1	(C)	9	BL	4	Worse	2
1					No effect	2
1			UL	5	Worse	3
					No effect	2

BL = bilateral; UL = unilateral

lumina of the ducts or in the degree of desquamation between the two sets of specimens. The incidence of "pale cells" and of "pale-celled papillomata" was unaffected in 11 cases. In 1 case both appeared after œstrogen, and in 1 both disappeared. True papillomata were found in 4 instances after injection when they had not been present before. Examination of the fibrous tissue showed no constant change, although there seemed to be a tendency in some cases treated with œstrogens to increased fibroblastic activity, especially of the subepithelial fibrous tissue, which was inclined to be more œdematous than in the control specimens.

In assessing these results we found that the changes were neither sufficiently constant nor sufficiently extensive for us to reach any conclusion from the small series examined. We have received the impression, however, that œstrogens cause an increase in fibroblastic activity, especially of the subepithelial fibrous tissue. Certain of the histological features of chronic mastitis appear therefore to be more advanced after the administration of œstrogens. This tentative assumption corresponds to our clinical findings and, taken in conjunction with them, suggests that abnormal activity of œstrogens may be a factor in the causation of chronic mastitis.

EFFECT OF ANDROGENS

We next investigated the effect of the administration of androgens as testosterone propionate, and patients receiving this substance were again subdivided into two groups:

Class 1, receiving less than 400 mg. of testosterone in four weeks.

Class 2, receiving 400 mg. in four weeks, together with those receiving higher doses or equivalent doses for longer periods.

There were 12 patients in class 1 (table III), and of these 6 improved and 6 showed no change in their clinical condition; 2 patients developed a growth of hair on the upper lip and chin, deepening of the voice, and amenorrhœa. Class 2 contained 22 patients (table IV), of whom 19 improved and 1 became worse; in 2 patients there was no effect; 6 patients developed hirsuties, changes of voice, and amenorrhœa; 1 patient developed cancer of the breast ten months later.

We concluded that patients with chronic mastitis were benefited, so far as the breast condition was concerned, by the doses of testosterone employed, but there was a high proportion of undesirable concomitant effects. Thus, 8 patients developed hirsuties, changes of voice, and amenorrhœa, and menstruation was upset in others. These symptoms persisted in some cases for nine months after the treatment had been stopped.

The age of these patients and the doses of androgens received are set out in table V, which supports the findings of Spence (1939) that it is mostly in younger patients that masculinisation tends to take place. The average age of this group (26) is less than that of all patients receiving androgens; 1 patient aged 40, however, developed these symptoms after relatively small doses of androgens. We have not had an opportunity adequately to follow up our patients treated with androgens, but 4 of those treated with large doses of testosterone propionate and listed as improved have attended my outpatient department since the war with a return of symptoms. Table III shows that, with doses of androgen sufficient to relieve only half the number of patients of their breast symptoms, 2 patients developed hirsuties. Although it seems that in testosterone we have an agent which acts beneficially in these cases, its threshold of effectiveness is so high that it may produce undesirable effects before it can benefit the condition for which it is being given. We therefore believe that the administration of androgens is justifiable at present on experimental grounds alone, and that they should not be prescribed therapeutically until their effects have been studied more carefully.

The case of the patient who developed carcinoma at the site of her lump of mastitis ten months after the administration of testosterone is worth recording in detail in view of the suggestion that this substance might protect patients against cancer of the breast (Loeser 1938). This woman is the only patient of the 212 attending the mastitis clinic who has developed a carcinoma of the breast in the three years since the clinic has been established.

The patient, aged 46, complained of a lump in the left breast for twelve months. This lump completely disappeared for three months and then reappeared five months before she attended the clinic. The lump, which was on the inner side of the breast adjacent to the nipple, bore none of the signs of cancer, and a biopsy from a part of the lump showed typical mastitis.

The patient was given testosterone, 1200 mg. in six weeks, and another biopsy was performed. This section was very

TABLES III AND IV—PATIENTS RECEIVING SMALL AND LARGE DOSES OF ANDROGENS

III—SMALL DOSES

Symptoms	No. of cases	Site	No. of cases	Results
(A) Lumpiness and pain	6	BL	2	Both symptoms improved
		UL	4	Both symptoms improved
				No effect
(B) Lumpiness only	1	BL	1	Diminished in size
(C) Pain only	5	BL	4	Improved
				No effect
		UL	1	No effect

IV—LARGE DOSES

No. of cases	Symptoms	No. of cases	Site	No. of cases	Results	No. of cases
2	(A)	17	BL	5	Both symptoms improved	4
					No effect	1
2			UL	12	Both symptoms improved	11
2					Lumpiness unaffected, pain worse	1
1	(B)	1	UL	1	Lumpiness became less obvious	1
1	(C)	4	BL	4	Improved	3
3					No effect	1
1						

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similar to the first, except for slightly increased adenosis and decreased fibrous tissue activity. Ten months later the patient came to my outpatient department with a small carcinoma of the breast at the site of the original lump of mastitis. I later performed a radical mastectomy. The cancer was of the spheroidal-celled variety, and the axillary lymph glands were not affected.

Histological effect.—Histological investigation was undertaken in 21 patients receiving large doses of testosterone. The technique employed was the same as that used in the series receiving œstrogens, and the same features were studied in the resulting sections. The

TABLE V—PATIENTS DEVELOPING HIRSUTIES, AMENORRHŒA, AND CHANGES OF VOICE

Case	Age (in years)	Treatment by testosterone propionate	Case	Age (in years)	Treatment by testosterone propionate
1	17	2400 units in 12 weeks	5	26	400 units in 4 weeks
2	19	2200 ,, 8 ,,			4 months' rest
3	19	1200 ,, 12 ,,			400 units in 4 weeks
4	21	400 ,, 8 ,,	6	31	2300 ,, 15 ,,
		6 months' rest	7	36	2400 ,, 12 ,,
		400 units in 8 weeks	8	40	1600 ,, 16 ,,

differences in the histological appearances of the two groups of sections were not so obvious as in the œstrogen series, and even less definite conclusions could therefore be drawn. After the administration of testosterone and with some exceptions (as in the case cited above) there appeared, however, to be a slightly diminished degree of epithelial activity as regards both adenosis and epitheliosis. The subepithelial fibrous tissue tended to decrease in amount and become invaded by the periacinous fibrous tissue. On the whole, although the changes were slight, some of the features of chronic mastitis appeared less advanced in most of the sections taken after the administration of androgens. The limitations of the method employed and the general similarity of the two groups of sections in the testosterone series, together with the small number of cases, made us doubt the value of this part of our investigation into the effect of testosterone on the human breast.

EFFECT OF DIATHERMY

Lastly, a small series of 6 patients was treated with short-wave diathermy (table VI); 1 of these patients did

TABLE VI—PATIENTS RECEIVING DIATHERMY

Symptoms	No. of cases	Site	No. of cases	Results	No. of cases
Lumpiness and pain	3	BL	1	Pain improved	1
		UL	2	Lumpiness and pain improved	1
				Pain improved, lumpiness unaffected	1
Pain only	3	UL	3	Improved	2
				Untraced	1

not return after the first treatment and could not be traced; the remaining 5 were relieved of their pain at least temporarily; 2 have since returned with recurrence of pain. Some patients not included in this series, because they had previously received œstrogens, were not relieved except for a few hours by diathermy. It is our impression that, as in the case of articular pains, it is those patients who notice that cold damp weather makes the pain worse who are benefited particularly by diathermy.

SUMMARY AND CONCLUSIONS

(1) Chronic mastitis has a large psychological element. In investigating the effect of therapeutic agents it is therefore necessary to exercise the most scrupulous control.

(2) The administration of œstrogens in doses sufficiently large to affect the breast was found to be harmful, and it was thought that the histological changes were advanced by this substance.

(3) Androgens can alleviate the symptoms of most cases of chronic mastitis, but the beneficial effect is not permanent, and undesirable concomitant effects may rob the treatment of its value.

(4) In 1 case of chronic mastitis, the only one of 212 to become malignant, carcinoma of the breast developed ten months after a course of testosterone-propionate injections.

(5) The histological changes in the breast produced by androgens in doses up to the limit of tolerance are insignificant.

(6) Diathermy is of value in alleviating the pain in chronic mastitis, but its effect is liable to be only temporary.

My thanks are due to my colleague and codirector of the mastitis clinic, Dr. Bishop, who has been responsible for the administration of the endocrines and for determining the doses to be used; to Mr. Clarkson, who performed many of the biopsies and helped me to examine the sections; and to Prof. Nicholson, for his advice on histological problems. The expenses of the investigation were defrayed by a grant from the British Empire Cancer Campaign.

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THE NOMENCLATURE OF INFLUENZA

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SINCE the discovery in 1933 (Smith et al.) that a virus pathogenic for ferrets could be recovered from patients with influenza, the same or closely related viruses have been obtained from outbreaks all over the world. The virus is probably the most important cause at the present time of epidemic influenza of man and is generally referred to in the literature as influenza virus or epidemic influenza virus. It has, however, become evident that the clinical picture historically recognised as influenza is not a single ætiological entity; in particular widespread outbreaks have been described (Francis 1937, Stuart-Harris et al. 1940) in which the ferret-pathogenic virus was apparently not concerned. Confusion may thus be introduced by attempting to confine the term "epidemic influenza" to the disease associated with the presence of that virus. It seems wise, therefore, to adopt a more precise terminology. The writers of this note, who are now or were formerly associated with work on influenza at the National Institute for Medical Research or at the laboratories of the International Health Division of the Rockefeller Foundation have agreed to use in future the nomenclature suggested below, and invite the coöperation of other workers in this field of investigation.

SUGGESTED NOMENCLATURE

Clinical influenza.—An ætiologically indefinite symptom-complex long recognised by physicians and characterised by the presence of the clinical manifestations which in recent years have been enumerated and described by Stuart-Harris, Andrewes, and Smith (1938), Francis (1939), Francis, Magill, Beck and Rickard (1937), Horsfall, Hahn and Rickard (1940) and Stuart-Harris, Smith and Andrewes (1940). The term includes the symptom-complexes referred to by Stuart-Harris et al. (1938, 1940) as "febrile catarrhs"; a sharp separation of these on clinical or epidemiological grounds has proved exceedingly difficult to establish.

Influenza A.—A specific disease entity caused by infection with any one of the various strains of the virus discovered by

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Smith, Andrewes and Laidlaw (1933) which will hereinafter be termed influenza A virus.

The separation of influenza A leaves a disease or group of diseases clinically resembling it but as yet of unknown ætiology. If and when hitherto undescribed viruses are isolated from this group and are shown to be of ætiological significance other specific diseases in the group could be labelled influenza B, C, &c., as they are found to be caused by the as yet hypothetical agents influenza B virus, C virus, ... &c.; if agents other than viruses are implicated the diseases in question should be given appropriate names which cannot be confused with those of the virus diseases.

Influenza A virus.—The virus discovered by Smith, Andrewes, and Laidlaw (1933), which was originally termed "influenza virus" or "human influenza virus" and more recently "epidemic influenza virus." If and when other "influenza viruses" are isolated from patients they could be labelled influenza B virus, C virus . . . . &c., to correspond with the diseases influenza B, C, ... &c.

Influenza-like diseases attacking primarily animals other than man (e.g., swine influenza) should be excluded from the A, B, C, ... terminology.

Confusion might arise if two independent groups of workers were to give the same letter to different viruses (such confusion is not unknown in the sphere of vitamins); or a letter might be bestowed on a virus whose status was subsequently rendered doubtful. It is suggested, therefore, that influenza viruses before being "christened" should be submitted for study either to the Rockefeller Institute or to the National Institute for Medical Research.

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SURVIVAL OF STORED RED CELLS AFTER TRANSFUSION

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WHEN a transfusion is given for anæmia, the important element in the blood is the red cell; likewise, with severe hæmorrhage a transfusion is often designed theoretically to restore red-cell elements so that oxygen-carrying power may be increased. But with acute hæmorrhage and more especially with wound shock there are other more important advantages to be gained from transfusion; these include restoration of blood volume, blood protein, and a reasonable blood-pressure; with such advantages this paper is not greatly concerned. In preparation for extensive battle and air-raid casualties both the military and the civil authorities established organisations for supplying blood in large quantities. In the waiting period this stored blood was much used for ordinary civil practice, and at the same time research was concentrated on the finding of diluents, anticoagulants, chemicals, and other factors designed to ensure that the red cells would, for long periods, be sufficiently well preserved to survive in a recipient when transfused. This survival of the red cells is clearly of great importance in many of the medical cases of civil practice; but for shock and acute hæmorrhage restoration of blood volume is more vital than oxygen-carrying power.

It was early noted by us that every transfusion of blood (to which, at that time, no glucose was being added) stored for more than two days caused a detectable increase in plasma bilirubin, even though no clinical jaundice was apparent. With large 3-pint drip transfusions an increase in plasma bilirubin was detectable even with two-day-old blood. This increase in plasma bilirubin was not due to free hæmoglobin in the transfused specimen, for none was ever obvious, and free hæmoglobin is rapidly excreted unless it is fairly concentrated. We found by experiment that transfusion of a volume of blood containing less than 3 g. of free hæmoglobin produced a detectable rise in plasma bilirubin, whereas the intravenous administration of 3 g. of free hæmoglobin to a normal man caused no such rise. These results suggested that rises in plasma bilirubin were due to in-vivo hæmolysis of transfused cells, and that the circulating pigment was derived from fragile cells contained in the transfused specimen.

The rise in plasma bilirubin was usually maximal about four hours after the transfusion of a pint of blood (occupying about twenty minutes), and had always declined very much by the end of twenty-four hours. Table I gives examples of these findings and shows the advantage of adding glucose to stored blood.

The only true test of whether transfused red cells endure in the recipient is to follow the fate of the cells by repeated examinations. For this purpose a simple blood-count is insufficient, because it does not show whether rises or falls in a total count are due to autogenous cells or to the transfused blood. But when group-O blood is transfused to a group-A or group-B patient, or when group-"M" blood is transfused to a group-"N" patient and vice versa, the fate of the transfused blood can be observed by the method described by Ashby (1921)—namely, by making counts of the cells not agglutinated by an appropriate serum. With ABO determinations, the non-agglutinated cells, except a number which is roughly constant for each case and can be determined, represent the transfused cells. These can be followed from day to day and even from hour to hour. We have studied the fate of stored blood of different ages by

TABLE I—QUANTITATIVE VAN DEN BERGH ESTIMATIONS AFTER TRANSFUSION OF 1 PINT OF BLOOD

—	Age of blood (days)	van den Bergh units		
		Before	In 4 hours	In 24 hours
Without glucose	5	0·50	3·00	0·75
	12	0·50	8·00	0·75
	18	0·25	9·00	1·00
With glucose	7	< 0·25	0·25	< 0·25
	12	< 0·25	4·00	1·00
	19	0·25	3·50	2·00
	36	0·25	3·00	1·50

the Ashby technique, and, from the results obtained with blood containing glucose and with blood containing no glucose, we have deduced that the in-vitro physical property of fragility is an index of the ability of the cells to endure in vivo. We have therefore used the quantitative fragility test as a criterion for assessing the value of a number of chemicals, diluents, preservatives, and other factors designed to prolong the period of preservation of red cells.

SURVIVAL OF TRANSFUSED CELLS

The technique employed was to transfuse group-O blood to a group-A or group-B patient. Counts of the recipient's blood were taken at intervals (table II), a 1 in 101 dilution being made with the appropriate α or β serum; the titre of the sera so used was 1 in 320. After being thoroughly mixed in the pipette, the contents were immediately expelled into a corked tube and incubated at 37° C. for an hour, being shaken at intervals of fifteen minutes. At the end of this time a drop was placed on a counting chamber and a count made of the "free" non-agglutinated cells, which represent transfused group-O cells. Before transfusion the "non-agglutinable count"—i.e., the number of A or B cells not agglutinated by the particular α or β serum—was determined in each

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patient. This number, which is assumed to be constant for each person, is subtracted as a correction from the "free"-cell count before the number of surviving group-O cells is calculated. With the sera used by us the "non-agglutinable count" was 50–100,000 per c.cm. During these investigations we observed that reticulocytes were agglutinated in the same manner as mature cells; this is contrary to the statements of Isaacs (1924). The

TABLE II—SURVIVAL OF TRANSFUSED GROUP-O CELLS (WITHOUT GLUCOSE)

Age of blood	Percentage of transfused cells surviving (days)					Final examination day/% surviving	Hæmolysis % in NaCl %					Hæmolysis
	1	2	3	4	5		0·5	0·55	0·6	0·65	0·7	
1	100	100	100	100	90	20/65	tr.	0	0	0	0	Nil
2	100	100	100	100	100	5/100	15	10	5	tr.	tr.	,,
3	100	90	90	85	80	20/58	30	10	tr.	,,	0	,,
4	80	80	80	80	80	25/40	20	10	5	,,	0	,,
5	100	95	—	—	—	—	5	tr.	tr.	,,	tr.	,,
5	100	70	60	50	50	5/50	20	15	5	5	,,	,,
5	100	90	90	85	80	5/80	10	tr.	tr.	0	0	,,
6	80	70	70	70	70	25/30	10	5	,,	tr.	0	,,
6	70	60	55	45	40	5/40	35	20	10	,,	tr.	< 1%
7	60	40	35	30	30	15/15	30	30	15	5	,,	< 1%
8	80	70	50	45	40	6/35	50	30	20	10	,,	< 1%
10	24	24	15	10	10	5/10	70	60	50	40	20	< 1%
10	40	35	30	25	20	5/20	80	70	60	30	30	1%
12	10	0	0	0	0	5/0	90	80	50	30	30	3%
16	80	50	24	18	12	9/0	60	50	50	50	40	6%
19	20	15	10	8	6	5/0	80	70	60	60	60	12·5%

cases included in tables II and III were largely of bleeding from the alimentary canal; old hospital patients with chronic disease, such as rheumatoid arthritis with anæmia, who volunteered to be subjects; and a few cases of non-hæmolytic blood diseases. So far as could be determined, bleeding had ceased in all hæmorrhagic cases.

Tables II and III show the percentage of cells surviving up to five consecutive days and for times up to twenty-five days, besides the quantitative fragility test of the transfused sample and the amount of hæmolysis present in it. The two tables demonstrate clearly the superior survival-rate and the superior fragility tests of the red cells of blood ten or more days old when preserved with glucose. The blood samples recorded in table II consisted of 100 c.cm. of a 3% solution of sodium citrate, 440 c.cm. of blood, and 40 c.cm. of a 0·85% saline solution; those in table III contained 40 c.cm. of a 5% solution of glucose instead of the saline solution, and this is now the routine anticoagulant used in the Army Transfusion Service. Fig. 1 shows graphically the facts concerning some of the cases recorded in tables II and III and emphasises the superiority of glucose-containing blood.

Fig. 2 shows the correlation between survival for a day and three days and the fragility to a 0·55% saline solution. The sources of error in the experimental method are considerable and probably amount to 20%. Among the various errors which arise are inaccuracies in counting; these are increased by the difficulty of deciding whether pairs of cells are the result of agglutination or of random settling, and whether large agglutinated clumps are obscuring free cells. Further, with aged blood the destruction of cells begins during transfusion; hence it is impossible to determine the number of cells transfused. This last error is greatly increased when a large transfusion is given slowly. In these circumstances the correlation between fragility and survival, which to be exact should show all points lying on a straight line, can be considered good and certainly good enough to indicate that fragility and cell survival are closely related. Tables II and III show that, although glucose decreases crude hæmolysis, absence of hæmolysis—e.g., less than 1% in thirty-six-day-old blood—does not necessarily imply long survival. Hæmolysis in the sample is not, therefore, a good index of cell survival.

INFLUENCE OF VARIOUS FACTORS ON THE FRAGILITY TEST OF STORED BLOOD

As a rule samples of blood have been examined for fragility and other tests have been applied after storage for seven, fourteen, and twenty-one days. In investigating any one particular factor, it is important that the samples tested at the above intervals be derived from the same donor. It is convenient, therefore, to collect blood for such tests into 30 c.cm. screw-cap bottles containing anticoagulant in the right proportions. This provides plenty of material for duplicate tests and allows many different tests to be performed at the expense of only one donor. It also ensures that a sample removed for test, say, at seven days has not to be examined and then again stored for further examination at fourteen days; an undisturbed sample is available for each test at the stated interval.

The following substances have been investigated for their influence on the fragility of stored blood. For economy in space the facts are categorically stated unsupported by the lengthy protocols of the vast number of quantitative fragility tests (Creed's method) on which the conclusions are based.

Carbohydrates.—All workers are agreed that glucose helps in the preservation of red cells. Tables II and III and figs. 1 and 2 clearly show the beneficial effect on survival and on fragility. The optimal final concentration of glucose is 0·25–0·50%. A final concentration as high as 1% is not so good, and concentrations less than 0·125% are even less so. It is the final concentration that is important and not the manner whereby this is obtained. For instance, it is immaterial whether a 5% or a 50% solution is added to the blood, so long as the final concentration is 0·25–0·50%. It is also immaterial whether glucose is added before the blood is taken or at any time within twenty-four hours of collection. Red cells which have become fragile cannot be reconditioned by the addition of glucose. Lævulose is as effective as glucose; saccharose (0·25–5·00%) and dextrin (2·5–16·0%) are slightly inferior; glycerol (1·5%) is definitely deleterious.

Citrate and other anticoagulants.—Experiments have shown that the strength of sodium citrate can vary from 2% to almost 4% without affecting the ultimate fragility test. Nevertheless, a 3% solution, judging from empirical observations, is as nearly isotonic with blood as can be attained. Strengths of 6% and 10% definitely increase fragility. It is immaterial whether the sodium or the potassium salt is used. Heparinised blood does not preserve so well as citrated blood; but, if the donor

TABLE III—SURVIVAL OF TRANSFUSED GROUP-O CELLS (WITH GLUCOSE

Age of blood	Percentage of transfused cells surviving (days)					Final examination day/% surviving	Hæmolysis % in NaCl %					Hæmolysis
	1	2	3	4	5		0·5	0·55	0·6	0·65	0·7	
5	90	90	90	90	90	12/90	30	10	tr.	0	0	< 1%
7	90	90	80	80	80	23/55	80	30	10	tr.	0	< 1%
8	80	70	70	65	60	5/60	90	30	tr.	0	0	Nil
11	86	75	70	65	60	5/60	60	30	10	tr.	0	,,
12	80	80	80	70	60	25/44	60	30	10	5	tr.	1%
14	70	65	60	60	60	8/30	80	40	30	20	10	Nil
16	90	85	80	—	—	—	80	40	30	15	<10	< 1%
19	80	50	50	50	50	5/50	50	40	15	10	tr.	< 1%
24	40	30	30	24	24	25/18	50	40	20	10	0	< 1%
36	60	40	30	25	20	14/0	80	60	50	30	20	< 1%

is heparinised and the blood received into citrate solution, the period of preservation is unaffected.

Dilution and plasma factors.—Fragility is greatly improved by dilution of the blood. This suggests that plasma factors are concerned in the deterioration of red cells during storage. For this view there is some experimental evidence in that substitution of plasma with a 3% solution of sodium citrate prolongs the period of preservation; but if physiological saline is used to replace plasma, the period of preservation is reduced.

Plasma does not appear to alter in tonicity on storage up to fifty days. Further, fresh cells suspended in plasmas of different ages are neither better nor worse preserved than in their own plasma. Blood diluted with equal parts of a 3% solution of sodium citrate is much better preserved than when it is diluted with 100 parts of the solution of sodium citrate to 440 parts of blood, as is usually done in the Army Transfusion Service. Dilution appears to be the only virtue in the complicated I.H.T. (Bagdassarov 1937) fluid which was used in equal

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parts with blood. When blood is excessively diluted, there is the disadvantage that the red-cell content of the transfused specimen is proportionately low.

Saline.—Physiological saline, unlike a 3% solution of sodium citrate, is a worse storage medium than plasma; and, when saline is added to an isotonic solution of sodium citrate, the period of preservation is shortened. The anticoagulant recommended by Harrington and Miles (1939) and widely used contains physiological saline and is definitely inferior to a simple 3% solution of sodium citrate (in the proportions of 100 c.cm. of solution to 440 c.cm. of blood), even though there is the compensating advantage given by the increased dilution in which this anticoagulant is ordinarily used—namely, 180 c.cm. of anticoagulant to 360 c.cm. of blood.

Temperature.—Storage of blood at 37° C., at room temperature (18°–22° C.), and at — 1·5° C. is definitely deleterious compared with storage at 4°–6° C. Rapid cooling of the blood after collection does not decrease fragility, even if the blood is received immediately into a cooled vessel. Other variations of this theme have been found to have no advantage. Undue delay (twenty-four hours) in refrigeration is deleterious; cooling to 0° C. for two days before storing at 4° C. has no effect; and warming to room temperature after four days at 4° C. has no adverse action. This last fact shows that

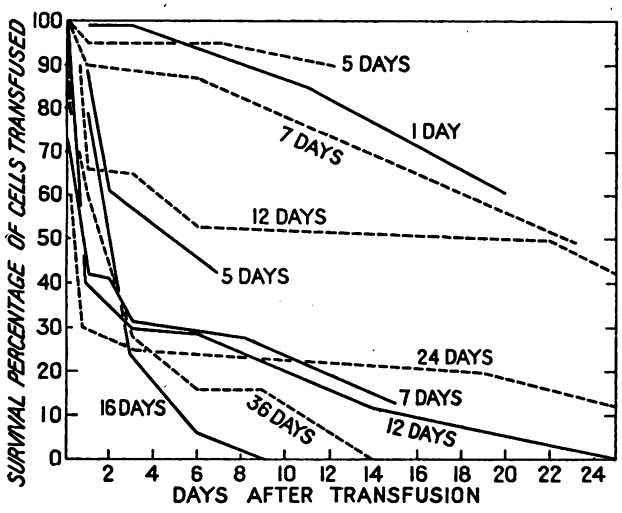

FIG. 1—Graphs showing the amount of blood of different ages which survives transfusion for a given time. The age of the blood is stated against each graph. Interrupted lines, glucose-containing blood.

it is possible to remove a bottle of sterile blood from the refrigerator, warm it up, and then store it again without detriment.

Acidification.—The pH of the Army blood mixture is ordinarily 8·6. The addition of buffer solutions is either deleterious or ineffective, but acidification with citric acid to pH 5 was found to improve fragility almost as much as did the addition of glucose. This effect with citric acid does not greatly enhance the action of glucose (fig. 3). The optimal action does not appear to be so much an adjustment of the pH of the anticoagulant as the addition of sufficient acid to overcome the buffering action of the blood and so alter its pH. The effect is independent of the citrate anticoagulant, for it can be demonstrated in heparinised blood, and it can be obtained by adding acids other than citric acid—e.g., hydrochloric acid and acetic acid. Acidification appears to retard glycolysis, and this is perhaps the reason for the beneficial action.

Though acidification prolongs the period of preservation of red cells and has the distinct additional advantage, when citric acid is added to sodium citrate, that the sodium citrate can then be autoclaved with glucose without caramelisation, it has been found by animal experiment that blood so acidified appears to have toxic properties. This is therefore not carried out in practice.

Oxygenation.—Saturation of blood with oxygen or the addition of hydrogen peroxide (2% of 10 volumes) improves the appearance of blood as well as the fragility

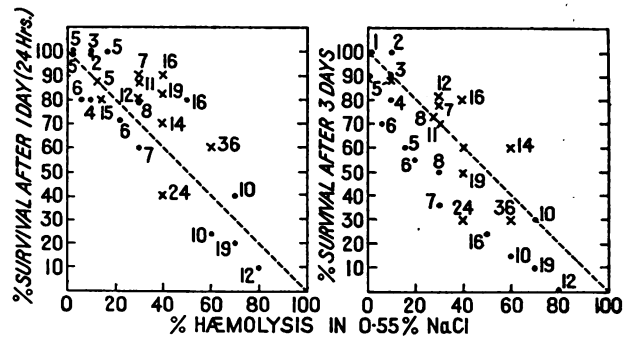

FIG. 2—Correlation between fragility to 0·55% saline solution and percentage of cells surviving one day and three days. The age of the blood is stated against the plotted points. Samples containing glucose are marked x.

in the early stages of storage (seven days), but the period of preservation is not prolonged by such treatment. With a view to designing the ideal container for the storage of blood, investigation was made to find whether there was any difference between the preservation of a thin layer of blood with a large surface exposed to air (2 c.cm. of blood in a 250 c.cm. flat bottle laid on its side and a thick layer with a small exposed surface (5 c.cm of blood in a 5 c.cm. bottle). No difference was detected.

Enzymes and leucocytic action.—Neither the addition of substances known to inhibit enzyme action nor the removal of sources of enzymes appears to have any action. Red corpuscles removed from the lowermost parts of a conical centrifuge tube contain no leucocytes; these red corpuscles when resuspended in the supernatant plasma are no better preserved than those of complete blood. Of substances known to inhibit enzyme action neither potassium fluoride nor potassium cyanide nor formalin has any beneficial effect on storage.

Sundries.—The following substances have either no action or else a deleterious action on blood storage: cholesterol, lecithin, formalin, unicol, phenates of sodium, tragacanth, and gum arabic (5% solution). It is perhaps noteworthy, in view of the division of opinion about gum saline, that when plasma is removed and red cells are resuspended in a 5% solution of gum arabic, hæmolysis of the cells is rapid.

COMMENTS

It is clear that, when blood is collected into a 3% solution of sodium citrate in the proportion of 100 c.cm. of citrate to 440 c.cm. of blood and stored at 4°–6° C., the following substances or procedures prolong the period of preservation of the red cells, as judged by a quantitative fragility test: adjustment of pH to 5 (of no value in practice), dilution, and addition of glucose. The effect of these various factors and their cumulative action are shown in fig. 3, which sets out the quantitative fragility tests of a sample of blood after twenty-one days' storage under the single and combined conditions. Of the single factors, glucose (curve 4) is outstandingly the best. The enhancement given by glucose and dilution (curve 5) or

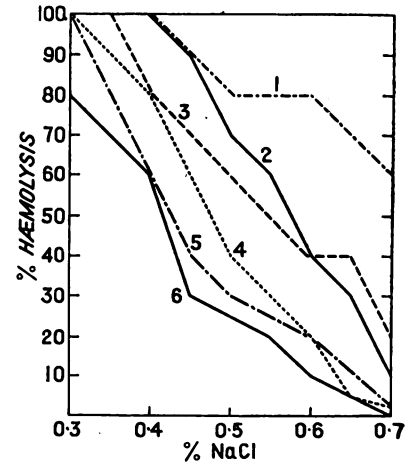

FIG. 3—Graphs showing the effect of various factors, singly and combined, on the quantitative fragility test of one and the same sample of blood stored for twenty-one days at 4° C. 1, standard anticoagulant control; 2, with pH adjusted to 5·0 (acidification); 3, with anticoagulant used in equal parts with blood (dilution); 4, with 0·5% solution of glucose; 5, with glucose + dilution; 6, with glucose + dilution + acidification.

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by glucose + dilution + acidification (curve 6) is recognisable as such, but the degree is not sufficient to justify utilisation for practical storage of blood.

For the acute hæmorrhage and shock of the wounded the prime necessity is to restore blood volume adequately. This is more vital than elevating oxygen-carrying power to a high level, for those who survive an acute hæmorrhage rarely die later from lack of oxygen-carrying power. Moreover, with restoration of blood volume the efficiency of such oxygen-carrying elements as have not been lost by hæmorrhage is automatically increased.

Brewer et al. (1940) have reported that stored blood (containing glucose) ten to fourteen days old is as efficient as fresh blood for the treatment of acute hæmorrhage. Our survival figures confirm this statement and show that even older blood survives a reasonable time in the recipient and certainly long enough to keep a wounded man alive until he arrives at a point where he can receive complete surgical treatment. Such was indeed the experience in recent campaigns, during which some five hundred transfusions were given of blood ten to thirty days old. Further, this old blood appeared to have a negligible incidence of reactions, even though it had been subjected to the batterings incidental to transport. This good preservation may have been partly due to the Army system of "topping" the bottle so that it is completely filled, all air excluded, and no slopping possible. De Gowin et al. (1940) found that hæmolysis was delayed when blood was stored in sealed air-displaced flasks, as compared with blood exposed to air. It is clear from the bilirubinæmia which is associated with the transfusion of stored blood that the older the blood the more rapidly are its fragile corpuscles destroyed. The iron pigment thus set free is phagocyted by the reticulo-endothelial system and assists in blood regeneration during convalescence from hæmorrhage. Provided that blood is not so old as to liberate too suddenly a dangerous quantity of pigment, the transfusion of even quite old blood to the exsanguinated has much to commend it.

In carrying out the vast amount of onerous, even boring, work which this paper represents we have had the loyal support of all the staff of the Army Blood-Transfusion Service, to whom our thanks are due. We wish to mention especially the help of Lieutenant Ethel Whitby, Lieutenant Joan Parry, Lieutenant Faith Poles, Lieutenant Joyce Morgan, and Staff-Sergt. R. Blake, of the R.A.M.C., and volunteers S. Kekwick and D. E. Vaughan-Jones, of the A.T.S. One of us (A. K.) gratefully acknowledges financial support from the Leverhulme Trust both before the war and since.

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SURVIVAL OF STORED BLOOD AFTER TRANSFUSION

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The establishment of so-called blood banks during the present war has focused attention on the use of stored blood in the treatment of hæmorrhage. There are several ways in which the value of stored blood may be investigated: by clinical observation; by the increase in the recipient's hæmoglobin brought about by transfusion and the permanence of this rise; and by the direct demonstration of the persistence of the donor's cells in the circulation of the recipient. There are certain difficulties in the way of the first two methods: clinical investigations require a large series of cases and minute observations; and the hæmoglobin level after transfusion is affected by numerous factors, including further hæmorrhage and dilution of the recipient's blood. On the other hand, the degree of persistence of the donor's cells after transfusion affords the most direct and positive evidence of the value of transfusion of stored blood. This third method was adopted in this investigation, which deals with the survival of stored blood-cells measured with iso-agglutinins and of changes in the chemistry of stored blood-cells in the recipient's blood after transfusion. Transfusions have been carried out with blood and citrate solution mixed in the proportion of 2 to 1. The citrate solution contained sodium citrate 1·05%, sodium chloride 0·85%, and glucose 3%.

SURVIVAL OF STORED BLOOD-CELLS MEASURED WITH ISO-AGGLUTININS

Ashby (1919) devised a method of measuring the survival of erythrocytes after transfusion of fresh blood by using group-O donors for group-A recipients. Blood was withdrawn from the recipient before transfusion and at suitable intervals afterwards and mixed with group-B serum. The recipient's (A) cells were agglutinated while the donor's (O) cells remained free and were counted. It was assumed that the number of free cells present at any given interval after transfusion represented the number of transfused cells surviving at that time. This method has been successfully applied to the transfusion of fresh blood by other workers (Wearn et al. 1922) and has been adapted to give rough quantitative results with M and N cells and antisera by Landsteiner et al. (1928) and Dekkers (1939).

We have applied this method to the measuring of the survival of stored blood and have simplified the technique by passing the mixture of agglutinated (A) cells, free (O) cells, and group-B serum through a filter paper. The agglutinated cells are retained by the filter. The free cells pass through and are easily counted. Although the technique of counting inagglutinable cells in unfiltered preparations is not difficult to acquire, filtration removes many irrelevant cells from the microscope field and makes counting quicker and easier.

Method.—20 c.mm. of the recipient's blood (in a hæmoglobin pipette) is mixed with 1·5 c.cm. of a solution containing sodium citrate 1·05% and sodium chloride 0·85%, and then 1·5 c.cm. of group-B serum is added. The serum must have a very high agglutinating titre (1/256 or more), because low titres give inaccurate results. The mixture of cells and serum is poured into a beaker (150 c.cm.) so as to form a thin layer on the bottom. This aids agglutination. After standing for two hours at room temperature the cell suspension is thoroughly mixed by rotation without shaking and poured through a filter paper (Whatman No. 4). It is important that the paper should fit the funnel snugly. The first seven or eight drops are collected and counted in the ordinary way. Occasionally, very small agglutinated masses pass through the filter paper. These and even pairs of cells in contact are rejected, so that only free single cells are included in the count. If many small agglutinates are found in the filtrate, it is probable that the titre of the agglutinating serum is too low. These low-titre sera do not agglutinate completely, even when mixed with cells possessing the appropriate agglutinogen, and the system resulting contains small agglutinates, paired cells, and single cells, most of which would be agglutinated by sera of higher titre. These high-titre sera not only agglutinate almost completely but also produce agglutinates of such consistently large size as to be completely retained by the filter paper. A good agglutinating anti-alpha serum when mixed with A cells shows 0·02–1·00% of unagglutinated cells—usually about 0·30%.

Errors, then, may arise from single A cells filtering through along with the O cells giving high results, and they may also arise from some of the donor's O cells being caught up in the mass of the recipient's cells or

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in the filter paper. This would tend to give low results. It follows, therefore, that the type of filter paper used is of importance. Our experiments were done with Whatman No. 1 of pre-war manufacture, and it was concluded that filtration did not introduce any serious inaccuracies in the cell counts, because duplicate experiments gave comparable results, whereas imitation of these counts with known amounts of O cells, A cells, and B serum in the right proportions mixed in vitro showed that over 80% of the theoretical number of O cells was recovered after infiltration. Thus, when 20 c.mm. of blood containing 5,000,000 A cells and 300,000–400,000 cells per c.mm. was mixed with 3 c.cm. of the diluted B serum and filtered, the percentage recovery and standard deviation in seventeen experiments was 87 ± 6; if A cells were kept at 5,000,000 and O cells were reduced to 175,000 per c.mm., recovery was $88 \pm 8\%$; and, when O cells were only about 90,000, recovery was $92 \pm 9\%$. It appeared, then, that pre-war Whatman No. 1 was very satisfactory, but the use of war-time Whatman No. 1 (which is made of different materials) gave a recovery averaging only about 70% (range 62–85%). This batch of Whatman No. 1 is therefore unsuitable for the special purpose, but war-time Whatman No. 4, which gives a recovery of 90%, is quite suitable. Roughly speaking, the percentage of cells recovered is proportional to the speed of filtration. Thus six pre-war Whatman No. 1's delivered 0·5 c.cm. in $14·3 \pm 1·5$ sec. from the time that the cell suspension was poured into the funnel; war-time Whatman No. 1 took 29 ± 3 sec.; and war-time Whatman No. 4 took only $4·5 \pm 0·5$ sec. Papers from these three batches gave 81, 62, and 89% recovery respectively. It is therefore suggested that experiments should be rejected in which filtration of 0·5 c.cm. takes more than 16 sec.; this is very unlikely to happen when pre-war Whatman No. 1 or war-time Whatman No. 4 is used. Further evidence in favour of these views is given in table I, in which are set out duplicate experiments showing the percentage recoveries

TABLE I—RECOVERY OF O CELLS FROM FILTRATES OF A CELLS, O CELLS, AND B SERUM MIXED IN VITRO

A cells in mixture before filtration per c.mm.	O cells in mixture before filtration per c.mm.	Net recovery of O cells after filtration %					
		Whatman No. 1 pre-war		Whatman No. 1 war-time		Whatman No. 4 war-time	
		a	b	a	b	a	b
0	260,000	97	90	74	70	96	84
5,200,000	260,000	102	87	75	66	95	85
5,200,000	130,000	86	87	70	68	89	94
5,200,000	65,000	96	94	71	75	88	82

of O cells filtered through pre-war and war-time Whatman No. 1 and war-time Whatman No. 4. It should be remembered that the figures in the two left-hand columns of the table refer to cells per c.mm. of original blood. Since 20 c.mm. of this blood was suspended in 3 c.cm. of a citrate-saline-serum mixture, the number of cells in the suspension is a hundred and fifty times less. Cell recovery after filtration of such suspensions was $90 \pm 10\%$.

Criticism of method.—In spite of the success attending the use of Ashby's method by several workers, Isaacs (1924) has levelled certain criticisms against the whole technique. It may be said at once that these criticisms are theoretical and are unsupported by numerical data. However, since the cell-agglutination technique is the only one which permits of a direct measure of cell survival, the objections must be considered in detail.

Isaacs points out that previous workers have found that, when group-A cells alone (without O cells) are mixed with B serum, there is a small residue of inagglutinable cells. In our work this inagglutinable residue usually amounts to about 20,000 cells per c.mm. of blood and constitutes a "blank" value which must be taken into consideration when counts are made after transfusion with O blood. Thus in table I the blank values have been subtracted from cell counts to obtain the net number of O cells in the filtrate. Isaacs says that this blank consists of immature erythrocytes (reticulocytes) normally present in the circulation, and that it is these immature cells which are inagglutinable. He also says that transfused blood, even when freshly drawn, is rapidly destroyed after transfusion, and that this evokes a reaction similar to that which takes place when the recipient's cells are rapidly removed from the circulation by whatever means—namely, the appearance of immature cells. It is this shower of immature cells which is said to be inagglutinable and not the donor O cells.

In Isaacs' paper there is very little evidence in favour of this view. He admits that two of his human cases showed no immature cells after transfusion; in two other cases a reticulocytosis is shown in accompanying graphs, but numerical data are not supplied. On the other hand, there are many serious objections, which may be summarised as follows:—

(1) If rapid destruction of transfused erythrocytes evokes a response of immature inagglutinable cells, there should be a higher inagglutinable cell count with old blood than with fresh blood, because old blood will be more rapidly broken down; but in fact the counts are lower.

(2) If the appearance of inagglutinable cells is evoked by the destruction of transfused cells, then transfusion from an A donor to an A recipient should give as high an inagglutinable cell count as transfusion from an O recipient to an A donor; but this is not so. According to Ashby (1924) transfusion of A blood to an A recipient caused sometimes a slight increase in the blank and sometimes a decrease.

(3) If the inagglutinable cells are immature, the filtrate from the recipient's blood after transfusion and agglutination should show a high reticulocyte count, and certainly a higher count than the bulk of the recipient's cells before agglutination with B serum; but the reverse is the case: the filtrate was devoid of reticulocytes in fourteen observations on six cases, and the recipient's whole blood contained 0·1 to 3·0 of reticulocytes.

(4) Whereas human erythrocytes may either possess isoagglutinogens A, B, or AB or else no agglutinogens at all (O), they always possess hetero-agglutinogens—M, N, or MN. Hence, provided that the donor's and the recipient's cells have different hetero-agglutinogens, their separate identities should be demonstrable after transfusion. If, for example, OM blood is given to an ON recipient and the recipient's blood is tested later, anti-M serum should show many free (recipient's) cells and a few agglutinated masses (donor's cells); if anti-N serum is used, the recipient's blood will show many agglutinated (recipient's) cells and a few free (donor's) cells. This method has been used by Dekkers (1939), who finds that, after the transfusion of fresh blood, donor's cells survive for many weeks in the circulation of the recipient.

It therefore seems that Isaacs' theories must be rejected, and that, when a recipient's (A) cells are mixed with B serum, the inagglutinable cell count before transfusion is due to the presence of recipient's cells containing insufficient agglutinogen to react with the agglutinins, and that the inagglutinable cell count after transfusion is due to the presence of these same cells plus the inagglutinable O cells of the donor. Theoretically, therefore, to obtain the true count of O cells surviving after transfusion, the blank value of recipient's A cells deficient in alpha agglutinogen should be subtracted from the total inagglutinable cell count. Unfortunately, the true blank value at the time of each observation cannot be known, and it may well differ from the original blank before transfusion. Indeed, it is possible that blanks vary in normal people from time to time, and this is more likely to happen in anæmic patients under treatment. In such people the red cells may double and the whole blood-count alter in a few weeks. There is no information as to whether the blank value changes in proportion.

For these reasons total inagglutinable cell counts only are shown in table II. To obtain a rough idea of the number of transfused cells surviving, it is simplest to subtract a maximal probable blank value of 50,000 cells from the total inagglutinable cell count. Since the blank is usually 10,000–50,000, subtraction of the latter figure will give, in all but a few cases, a value which equals or is slightly less than the number of donor's cells surviving after transfusion.

If the data in table II are interpreted in this way the following observations may be made. Patients may be

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TABLE II—INAGGLUTINABLE CELL COUNTS

Case	Age of stored blood (days)	Inagglutinable cell count per c.mm.											
		Before transfusion (blank)	Days after transfusion										
			1/12th	3	6	9	15	21	28	35	42	49	63	84
1	1	17,000	580,000	570,000	475,000	360,000	..	..	..	..	..	..	..	..
2	2	150,000	560,000	..	475,000	..	..	..	..	..	..	..	..	..
3	6	20,000	350,000	365,000	..	267,000	245,000	..	288,000	221,000	..	176,000	123,000	28,000
4	7	120,000	930,000	..	880,000	..	..	..	..	..	..	..	..	..
5	7	12,000	290,000	360,000	290,000	290,000	..	280,000	150,000	150,000	166,000	..	..	61,000
6	7	34,000	545,000	387,000	410,000	355,000	355,000	344,000	186,000	..	..	152,000	152,000	..
7	8	50,000	850,000	650,000	810,000	..	385,000	359,000	..	290,000	280,000	272,000	102,000	..
8	8	40,000	380,000	272,000	248,000	..	198,000	..	..	..	..	..	..	..
9	8	4000	275,000	..	234,000	..	..	..	..	..	..	..	..	..
10	12	20,000	420,000	408,000	376,000	..	425,000	205,000	..	227,000	198,000	130,000	42,000	..
11	13	16,000	306,000	297,000	297,000	..	284,000	297,000	..	..	..	..	..	..
12	14	10,000	630,000	360,000	290,000	310,000	..	..	..	..	..	..	..	..
13	14	20,000	530,000	452,000	450,000	..	..	229,000	..	..	..	..	..	..
14	14	12,000	320,000	..	186,000	..	138,000	173,000	112,000	..	..	..	..	..
15	15	20,000	320,000	212,000	210,000	190,000	..	192,000	..	..	..	167,000	119,000	118,000
16	15	10,000	250,000	62,000	50,000	..	..	..	..	..	..	..	..	..
17	15	24,000	340,000	140,000	150,000	..	109,000	..	110,000	95,000	..	72,000	..	27,000
18	16	14,000	226,000	240,000	185,000	..	..	..	..	..	..	..	..	..
19	19	87,000	240,000	222,000	154,000	..	164,000	..	..	..	..	..	..	..
20	19	10,000	270,000	249,000	230,000	237,000	..	..	..	..	..	..	..	..
21	21	20,000	200,000	38,000	28,000	..	..	..	..	..	..	..	..	..
22	21	60,000	220,000	220,000	180,000	..	..	..	..	..	..	..	..	..
23	21	26,000	80,000	72,000	34,000	..	..	..	..	..	..	..	..	..

divided into three groups; those receiving blood less than a week old, those receiving blood between one and two weeks old, and those transfused with blood more than two weeks old. In the first group, when the donor's blood was less than a week old, more than 75% survived six days after transfusion, and more than 66% was still present fifteen days afterwards.

In the second group, where cells were stored for seven to fourteen days, more than 75% of cells survived after six days and 45–100% were still present fifteen days after transfusion.

In most cases the count of transfused cells declined some time in the first fortnight. The counts remained fairly constant during the third week but thereafter again gradually declined. However, in some instances transfused cells were still found months after transfusion.

In the third group of cases receiving blood stored for more than a fortnight the data are scanty. There was a rapid fall in the agglutinable cell count in the first three days after transfusion in cases 15, 16, 17, and 21, and by the sixth day in cases 19 and 23. In cases 15 and 16 cell destruction was very noticeable during the first three days, but after this it was much slower, and in case 15, as in case 5, there was evidence that transfused cells were still surviving after eighty-four days. The inagglutinable cell counts in these two cases were checked by using two different sera of titres 1/512. The low count after transfusion in case 23 suggests that the cells were being rapidly destroyed even during the transfusion. Even normal blood contains many aged erythrocytes, and rapid destruction of these must be expected even after the transfusion of fresh cells. It seems possible that the rapid initial fall in the number of transfused cells for stored blood may be due to the destruction of effete corpuscles, and that those that do not quickly succumb are relatively resistant to hæmolysis. It has only been possible for us to check our results with hetero-agglutinating sera (anti-M and anti-N) in one case (No. 16) here thirty-five days after transfusion, the bulk of the recipient's cells were agglutinated by both anti-M and anti-N; the cells in the filtrate after preliminary agglutination with B serum reacted only with anti-M serum and not with anti-N. In this instance, then, the existence of two races of cells in the recipient's circulation was demonstrated thirty-five days after transfusion by iso- and hetero-agglutination.

SODIUM CONTENT OF STORED CELLS AFTER TRANSFUSION

It has been shown (Maizels and Whittaker 1940) that stored erythrocytes often contain more than four times as much sodium as do fresh cells. Since it is known that stored cells survive for many days after transfusion, it was thought of interest to measure what changes took place in the chemistry of the donor's cells after they had reached the recipient's circulation.

Method.—The specimens were centrifuged for fifteen minutes at 3000 r.p.m. The supernatant plasma and upper face of the erythrocyte columns were removed with a capillary pipette. The residues were recentrifuged, and any remaining trace of plasma was finally removed. 0·5 c.cm. of cells was ashed in platinum crucibles and the ash taken up in 2 c.cm. of water to which was added 0·1 g. of calcium hydroxide. The contents of the various crucibles were centrifuged in pyrex tubes, 1 c.cm. of the clear supernatant solutions and 1 c.cm. of each of the four dilute standards placed in other tubes, and the sodium contents estimated by precipitation with zinc uranyl acetate according to the method of Salit (1932) slightly modified.

In plasma, where the Na/K ratio is high, Salit's method gives accurate results, but human erythrocytes have a very low Na/K ratio, and in our experience this method gives results which are too high, and the zinc uranyl acetate precipitated from ashed cells contains a high proportion of potassium, at least under conditions of temperature found in England during winter and spring. Precipitation of sodium with little or no potassium was obtained if to 1 c.cm. of the cell extract and the diluted standards were added 2·3 c.cm. of Salit's zinc uranyl acetate reagent, 0·7 c.cm. of water, and 0·55 c.cm. of alcohol.

After standing for forty-five minutes, the tubes were centrifuged and the precipitates washed with alcohol saturated with sodium zinc uranyl acetate. The precipitates were then taken up in 50 c.cm. of water; 0·2 c.cm. of glacial acetic acid and 0·5 c.cm. of potassium ferrocyanide (20%) were added. The various unknown samples and the three other standards were compared with the remaining standard in a colorimeter, and the final results were worked out from the calibration curve obtained.

Samples containing known amounts of sodium within ± 50% of the standard show results in good agreement with the theoretical values. Figures outside this range must be obtained by reference to the calibration curve. This curve is fairy reproducible, the data usually being approximately as follows (table III).

TABLE III—ESTIMATION OF SODIUM
Standard = 80 mg.%

Theoretical value (mg.%)	Colorimetric value (uncorrected)
16	21
48	51
80	80
112	104

The strong standards contain 100, 300, 500, and 700 mg.% respectively. For use, these strong standards are diluted twenty-five times.

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TABLE IV—SODIUM CONTENT OF STORED CELLS AFTER TRANSFUSION

Case	No. of days stored	Blood	Sodium content of cell (mg. per 100 c.cm.)	Icterus index	Inagglutinable cells per c.mm.
1	3	Donor's	80·0	..	..
		Recipient's before transfusion	40·6	2·5	..
		,, 2 hours after transfusion	47·6	2·5	..
		,, 24 ,, ,, ,,	39·1	2·5	..
2	3	Donor's	..	..	..
		Recipient's before transfusion	30·0	..	..
		,, ½ hour after transfusion	46·0	..	
		,, 24 hours ,, ,,	29·0	..	550,000
3	5	Donor's	101·0	..	..
		Recipient's before transfusion	30·0	..	..
		,, ½ hour after transfusion	54·0	..	..
		,, 48 hours ,, ,,	33·0	..	500,000
4	8	Donor's	140·0	..	..
		Recipient's before transfusion	33·0	..	50,000
		,, ½ hour after transfusion	72·0	..	850,000
		,, 24 hours ,, ,,	36·0	..	670,000
5	8	Donor's	146·0	..	..
		Recipient's before transfusion	24·0	2·5	4000
		,, ½ hour after transfusion	46·0	4·0	270,000
		,, 24 hours ,, ,,	28·0	2·5	310,000
6	8	Donor's	93·0	..	..
		Recipient's before transfusion	26·1	4·0	..
		,, ½ hour after transfusion	46·0	..	..
		,, 24 hours ,, ,,	26·8	6·0	..
7	14	Donor's	112·0	..	..
		Recipient's before transfusion	26·1	..	..
		,, ½ hour after transfusion	54·2	..	..
		,, 24 hours ,, ,,	25·4	..	..
8	14	Donor's	182·0	..	..
		Recipient's before transfusion	32·0	3·0	..
		,, ½ hour after transfusion	48·7	28·0	..
		,, 24 hours ,, ,,	31·3	6·0	..
9	16	Donor's	142·0	..	..
		Recipient's before transfusion	33·0	2·5	14,000
		,, ½ hour after transfusion	44·2	9·5	226,000
		,, 24 hours ,, ,,	33·3	3·0	244,000

Results.—Table IV shows that the sodium content of the erythrocytes of stored blood is several times greater than that of the recipient's cells before transfusion. Immediately after transfusion there is a rapid rise in the level of the sodium of cells in the recipient's circulation (which now contains a proportion of donor's cells), and this is to be expected. But in almost every instance the sodium level has returned within 24 hours to that found in the recipient's cells before transfusion. This can only mean that the transfused cells have been destroyed, or that they have been chemically "reconditioned," with the result that the great excess of sodium is removed and replaced by its equivalent of potassium. Parallel figures in table IV and all the data in table II show that disappearance of sodium is not accompanied by a corresponding fall in the count of donor's cells, and it is therefore necessary to conclude that the rapid return of sodium to normal is due to a process whereby the excess of sodium is removed and replaced by potassium. Since this ionic exchange between donor's transfused cells and recipient's plasma must take place against a steep concentration gradient, it cannot be due to any simple physical process. An actual example will make this clear.

In case 9 cells containing 142 mg. of sodium per 100 c.cm. (62 milliequivalents per litre) are given to a recipient whose plasma sodium will certainly be 300–350 mg. per 100 c.cm. (130–150 m. eq.). Yet in this medium so rich in sodium the sodium of the donor's cells falls by 109 mg. (48 m. eq.) to only 33 mg. per 100 c.cm. (14 m. eq.).

If this fall in sodium were accompanied by a corresponding rise in potassium, potassium in the donor's cells would increase by no less than 48 m. eq., although the plasma in which they are suspended will certainly contain less than 6 m. eq. K. These figures for K are only rough approximations, but it is probable that the gain in K of donor's cells after transfusion is many times greater than the absolute K content of the recipient's plasma in which they are suspended. Since, then, all these changes cannot be explained by simple physical processes, one must presume that they are brought about in a much more complex manner. Possibly the spleen, which is known to produce changes in the surface of erythrocytes (Stephens 1938), may play a part.

SUMMARY

Stored blood survives for considerable periods after transfusion. Red cells stored for less than a week show about 70% of survival 14 days after transfusion. If storage is between 7 and 14 days more than half the transfused red cells are still present in the recipient's circulation 14 days after transfusion. During storage normal cells lose potassium and take up a great excess of sodium. Within twenty-four hours of transfusion the chemistry of stored cells is restored to normal.

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SURVIVAL OF THE TRANSFUSED ERYTHROCYTES OF STORED BLOOD*

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(From the South-West London Blood-Supply Depot)

THE opinion that the erythrocytes of stored blood do not survive long after transfusion has been expressed by many authors. Thus Riddell (1939) considers that because of the increased fragility of the cells of blood that has been stored for more than four days "it is very doubtful whether it would exert any prolonged therapeutic effect." Marriott and Kekwick (1940) sum up available evidence as follows: "Red cells of blood conserved for more than a week by present methods do not last long in the recipient." Again, Edwards and Davie (1940) state that "aged erythrocytes and those in which the fragility has been increased have only a short effective span of life and can therefore have little lasting value." These statements are, perhaps, rather surprising since in 1916 Peyton Rous and Turner concluded from their experiments on rabbits that cells stored up to two weeks function normally after transfusion. This conclusion was reached after studying blood-counts, estimating the excretion of hæmoglobin and bile pigments, and so on.

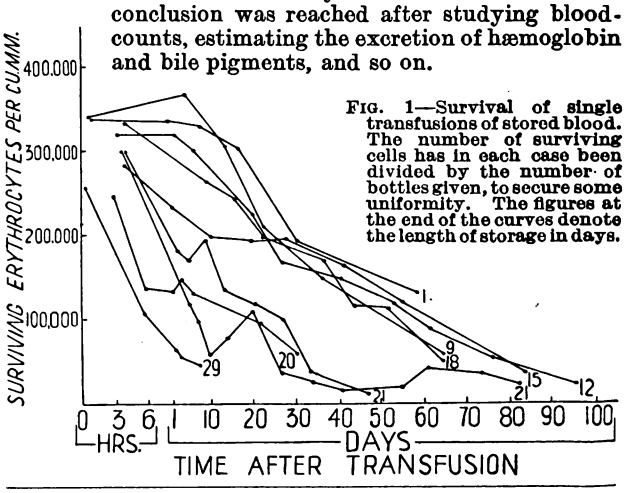

FIG. 1—Survival of single transfusions of stored blood. The number of surviving cells has in each case been divided by the number of bottles given, to secure some uniformity. The figures at the end of the curves denote the length of storage in days.

* The details of this work are to be published later with particulars of technique and methods.

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In March of this year we had the opportunity of examining some results obtained by Dr. J. O. Oliver, then director of this depot, and Dr. G. L. Taylor of the Galton Laboratory Serum Unit. They followed seven cases by the direct differential method (referred to below), using M and N agglutinating sera. They showed that transfused erythrocytes of stored blood survived for some weeks after transfusion. In one patient, for instance, who received 11-day-old blood the donor cells could be identified by direct agglutination after 51 days. The object of this investigation has been to extend these observations further and in greater detail and to apply to the problem a method capable of giving quantitative results.

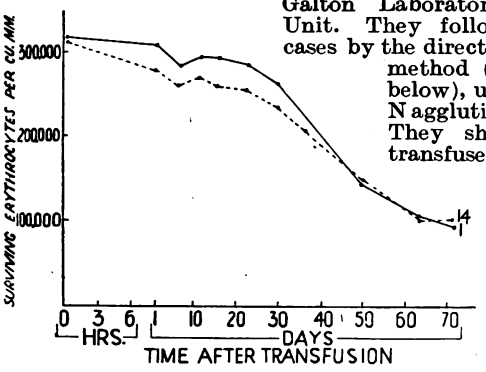

FIG. 2—Survival of two simultaneous transfusions in the same patient. There is scarcely any difference between blood stored for 1 and for 14 days.

Methods of following quantitatively the fate of transfused erythrocytes are all based on the one described by Ashby in 1919. This, in brief, consists of the transfusion of cells of group O to a recipient of group A. After transfusion the recipient's blood contains two types of cells, O and A. The A cells can be "removed" with alpha serum and the free (O) cells counted. Actually a small fraction of the A cells are not agglutinated and constitute a blank value to be deducted from the total of free cells. Wiener (1934) has adopted the method using the sub-groups M and N. For example, if cells of group M are transfused to a recipient of group N, the N cells can be agglutinated and the free (M) cells of the donor counted.

The method of direct differential agglutination consists of transfusing blood containing one of the agglutinogens M or N not possessed by the recipient. This "foreign" agglutinogen is then identified in a sample of the recipient's blood at different intervals after transfusion. We employed both of the quantitative methods and also combined them, either to obtain more certain results with single transfusions, or in order to follow the fate of different transfusions given simultaneously to the same patient. We could thus directly compare the survival of blood stored for short and long periods. This method could also be applied to a direct comparison of methods of storage. A micro-technique was used.

The blood used in these experiments was taken into citrate glucose saline and stored for periods up to 29 days before transfusion. The recipients were mainly women suffering from anæmia connected with pregnancy or parturition.

RESULTS

In fig. 1 the results in a representative sample of the cases are shown graphically. It will be seen that when blood less than 18 days old was transfused the time taken for the complete disappearance of all the donor erythrocytes was 70–90 days—that is to say, little less than that found for fresh blood (Ashby 1919, Martinet 1938). Furthermore, approximately the expected number of erythrocytes appear in the recipient's circulation after transfusion.

In the cases in which a direct comparison between fresh and stored blood was made, similar results were obtained. Fig. 2 depicts one of these cases.

In the cases which received blood over 20 days old a great deal of destruction took place within the few hours after transfusion and considerable rises in serum bilirubin were found.

SUMMARY AND CONCLUSIONS

Twenty-six transfusions of stored blood were given to twenty patients and the survival of the donor's cells was followed quantitatively by differential agglutination.

In four cases two transfusions of blood stored for different periods were given simultaneously to the same patient. The fate of the cells of each transfusion was followed separately by a method employing the sera both of the ABO and MN systems. In this way a direct comparison of the survival of stored blood and fresh blood was made.

A high proportion of the erythrocytes of stored blood survive transfusion. Furthermore, the total time of survival is little less than that of fresh blood.

These observations suggest that the present method of storage employed at the London blood-supply depots is good and that little more than the normal ageing process takes place, at least in blood stored for 18 days or less.

We wish to thank Dr. J. O. Oliver, formerly director of this depot, and Dr. O. M. Solandt, his successor, for advice and criticism; Dr. M. Maizels who provided the impetus for this work and allowed us access to his results at all stages; and Dr. G. L. Taylor of the Galton Laboratory Serum Unit for supplying us with M and N agglutinating sera.

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ASTHMATIC ATTACK STUDIED THROUGH THE BRONCHOSCOPE

BY A. L. D'ABREU, Ch.M.Birm., F.R.C.S.
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I HAVE recently had the opportunity to study the living pathology of an asthmatic attack. The patient was under the care of Prof. G. W. Pickering and Dr. E. I. Jones in the Emergency Medical Service hospital at Harefield, where I was on temporary duty.

Bronchoscopy was carried out to exclude neoplasm in a man of 53, who for the last three years has been suffering from increasing dyspnœa. He has suffered from bronchitis which first affected him in 1917. In the last three years he has become increasingly conscious of shortness of breath associated recently with severe paroxysms at night of an asthmatic nature. His chest is barrel-shaped and emphysematous with scattered moist râles and rhonchi audible throughout the lung fields. The radiological appearances are those of emphysema.

On arrival in the theatre the patient was slightly dyspnœic but not in an asthmatic attack. His lips, tongue, palate and fauces were anæsthetised with a cocaine (10%) spray and both pyriform fossæ painted with the same solution, ten minims of which was then injected through the cricothyroid membrane. The bronchoscope passed easily through the glottis and beyond the vocal cords. I noticed at once that the carina was thicker and redder than usual and as I announced this I saw that it suddenly altered its shape and became "buckled" from before backwards while its covering mucous membrane became crimson. The right and left bronchial orifices contracted to less than their normal size and their membrane was deeply congested; an asthmatic attack developed. After waiting for a short time with gradual coaxing of the instrument I was able with difficulty to pass the bronchoscope into the left and then the right bronchus. All the bronchi were much contracted, the bronchus to the right middle lobe being visible as a mere slit. These bronchi varied slightly from time to time but never relaxed to their normal size. In both main bronchi small fibrin plugs (Curschman's spirals) were seen adhering to the reddened bronchial mucosa. Very little mucus was observed. After removal of the bronchoscope the patient continued in a typical attack of asthma which was not notably relieved by an injection of adrenaline.

The direct observation of these phenomena confirms that the mechanism of the asthmatic attack is bronchial spasm and congestion of the thickened mucous membrane associated with the formation of fibrin plugs. The change in the shape of the carina by a spastic shortening is of interest. I do not know whether this has been noted before.

I am indebted to Dr. K. R. Stokes, deputy medical superintendent at Harefield, for permission to publish this note, and to Professor Pickering and Dr. Jones for their help and interest.

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Reviews of Books

Chemotherapy and Serum Therapy of Pneumonia

By F. T. LORD, M.D., clinical professor of medicine, emeritus, Harvard Medical School; E. S. ROBINSON, M.D., Ph.D., director, division of biologic laboratories, Massachusetts Department of Public Health; and R. HEFFRON, M.D., medical associate, the Commonwealth Fund. London: Humphrey Milford, Oxford University Press. Pp. 174. 6s.

WITH the approach of the pneumonia season this is a handbook which every interested physician ought to buy and study. The title of the book—the third in a series first published as Lobar Pneumonia and Serum Therapy and then as Pneumonia and Serum Therapy when the range of therapeutic sera was extended to the pneumococcus types which cause bronchopneumonia—indicates the latest advance in the treatment of the pneumonias. It is a compact store-house of useful information on all aspects of pneumonia, and has the advantage over its predecessors of containing data and analyses from Heffron's fine work on pneumonia published in 1939 (see *Lancet*, 1940, **1**, 551). Sulphapyridine was not given a very good reception in America, so that the considered statement of the authors that it is "not only a most useful remedy but also one which is on the whole more efficacious than serum" is praise indeed. The dosage and action of the drug and the results obtained are carefully considered and analysed. Perhaps too much emphasis is given to its possible toxic effects; for example, the authors recommend complete blood-examinations before treatment is begun and each day thereafter, and they disadvise continuance of the drug beyond the fourth day unless the blood-concentration is being estimated daily. Results from therapeutic rabbit antiserum are contrasted with those obtained with horse serum (combined figures show little difference between the two) the relative merits of and indications for serum or chemotherapy are discussed, and a plea is made for combined treatment under such circumstances as when the patient is first seen late in the disease, is over 50 years of age, has a positive blood-culture, is pregnant or does not improve with one or other treatment alone.

Rose & Carless's Manual of Surgery

(16th ed.) By CECIL P. G. WAKELEY, F.R.C.S., and JOHN B. HUNTER, F.R.C.S. London: Baillière, Tindall and Cox. Pp. 1708. 2 vols. 30s.

THE successive authors of this excellent textbook have had the happy knack of giving the undergraduate exactly what he wants. This has necessitated considerable changes which are particularly notable in the present edition. The first eight chapters on general pathology have been simplified and shortened; a very welcome revision. Simplification and clarification have also been obtained by combining the chapters on shock and hæmorrhage and those on gangrene and ulceration. A section on the treatment of war wounds has also been added. There have been so many advances or alterations in the management of fractures, diseases of the central nervous system and chest conditions that extensive revision had to be carried out, and no less than 300 illustrations appear in the text for the first time. The scope of the book is wide enough to supply the practitioner with a trustworthy guide to all branches of surgery.

Biochemistry of Disease

By MEYER BODANSKY, Ph.D., M.D., director of the John Sealy memorial laboratory and professor of pathological chemistry, University of Texas school of medicine; and OSCAR BODANSKY, Ph.D., M.D., lecturer in biochemistry, graduate division, Brooklyn College. London: Macmillan and Co. Pp. 684. 30s.

THIS book embraces the whole field of clinical biochemistry. Several such textbooks already exist, but the unusual presentation of the Bodanskys' work gives it an exceptional value. General presentation of carbohydrate, fat, protein and mineral metabolism, and descriptions of chemical methods are avoided. The subject matter is arranged according to clinical entities, and thus there is a systematic presentation of the biochemical aspects of the various diseases. A mass of biochemical information is in this way made readily available to clinicians who do not require to read through technical methods before obtaining the necessary information. Useful information is given on prothrombin and vitamin K, diseases of the endocrine glands, and on the neglected subjects of biochemistry in obstetrics and gynæcology and the biochemical aspects of neurological and psychiatric disorders. Each chapter contains a full list of references. Practitioners, students and clinicians will find the book of outstanding value for reference and as a review of recent work.

Pharmacology and Therapeutics of the Materia Medica

(16th ed.) By WALTER J. DILLING, M.B. London: Cassell and Co. Pp. 580. 12s.

THE recent alteration in format has made this useful manual much more readable. In a book of this type it is not possible to deal exhaustively with many subjects, but more than two pages might have been spared for the sulphonamide compounds. The new preparations of vitamins A and D which became official in June, 1940, with the publication of the Second Addendum to the British Pharmacopœia 1932 are included, and an indication of the international upheaval is seen in the official pharmacopœial names now adopted for drugs previously known under trade names.

Handbook of Radiography

By JOHN A. ROSS, M.A. Camb., M.R.C.S., D.M.R.E., radiologist to the Warrington Infirmary. London: H. K. Lewis and Co. Pp. 126. 7s. 6d.

A HANDBOOK for medical technicians must always be dogmatic if it is to avoid confusion. For this reason a textbook intended for the student pharmacist is of little value to the student of pharmacology. The same applies to the radiologist and the radiographer—on the one hand the training is scientific, on the other technical. Dr. Ross writes for students of both radiology and radiography, and therein lies a weakness. However, as he points out, there is undoubtedly a place for a handbook on radiography like this, illustrated with simple line drawings. The book has the advantage of being easily portable, and blank pages for notes are an excellent idea. Some form of tabulation for each technique would be useful, giving specific figures for such factors as kV, mA, time, distance, size of diaphragm or cone, size of film, screens, grid, angulation of tube, position of central ray, method of immobilisation of part, and stereoscopy. The radiographer could then modify each factor according to the requirements of each individual apparatus and radiologist and enter them up on the opposite blank page. Sufficient stress is not laid on the necessity for taking at least two right-angled views in most branches of radiography. For example, only one projection is described for the shoulder. Here stereoscopy is recommended, but it will never be a satisfactory substitute for another view at right angles. Stereoscopy should always be regarded as an ancillary method of examination. In the chapter on the skull the special projections, such as are required for the petrous bone, are scarcely mentioned, and these are some of the most difficult views that a radiographer is called on to produce. There are one or two other omissions, such as arthrography and the outlining of the pancreas by filling the stomach with gas, but otherwise the radiographic field is well covered.

Principles of Animal Biology

(2nd ed.) By LANCELOT HOGBEN, F.R.S. London; George Allen and Unwin. Pp. 415. 7s. 6d.

WHEN first published in 1930 Professor Hogben's book was an innovation, and probably for that reason never became popular with teachers. While insisting on the need for a knowledge of sound established facts, and giving many useful hints as to how they can be learnt, his chief aim is to give the student an insight into the biological problems of today. In the successful combination of these two aims this book is unsurpassed. It would be difficult to find a better elementary introduction to modern genetics than chapter VIII, with its admirable series of problems to be solved. The new edition has been extensively revised and has been illustrated afresh by J. F. Horrabin. Professor Hogben's reputation has increased since 1930, and it is certain that this edition will enjoy a much wider circulation, which we hope will include members of the schools and universities.

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THE LANCET

LONDON: SATURDAY, OCTOBER 5, 1940

CASUALTIES IN LONDON

Now that the Philistines are upon us we can judge the quality of our own foresight. With air-raid casualties, as with any other wounded people, the aim must be to ensure that urgent cases are treated first. Early expert classification would make this possible, but it cannot be achieved in the peace-time hospitals of London; they are not laid out for it, they are dangerous, and they are in the wrong places. Their vulnerability has been amply demonstrated lately, and it was not unforeseen. We drew attention to it in an annotation last year,[1] and in the same issue CROME, FISHER and SHIRLAW[2] advocated casualty clearing stations in the basements of steel-framed buildings—buildings to be chosen not for their traditional associations with healing but because they were safe, and close to main lines, underground railways or arterial roads by which patients fit for transport could be evacuated. They pointed out that the London hospitals, besides being old and collapsible and badly placed for transport, were so well known in their own neighbourhoods that in any large disaster they would be overwhelmed by patients hurrying to an accustomed refuge. They also urged the vital importance of skilled classification, which cannot be left to first-aid workers, however willing. These can, as they said, divide patients roughly into "those who can be sent home, to the surgeon or to the mortuary," but they are totally unqualified to say which need priority of treatment or which are able to support a journey out of London by train or ambulance. That is a task for an experienced surgeon; it calls for concentration and cannot be carried out with precision in premises in the front line shaking under the impact of neighbouring explosions. Moreover, some of the patients need immediate operation to save their lives or limbs, and the operating surgeon can do his best for them only if he is protected while he works.

Fortunately we are told that casualties in London have so far been fewer than the authorities expected, but that hardly excuses the inadequacy of existing arrangements, especially since an effective alternative can be put into action with little trouble or cost. In every dangerous area it would be possible, as SHIRLAW says in his book,[3] to set aside for the reception of casualties a capacious basement—there are many available among the steel-framed factories, warehouses, garages, hotels and office blocks of London—close to a railway or main road or both. This would be subdivided into four departments. In one the patients would be at once classified by the receiving surgeon as suitable to be sent home, transferred by ambulance or train to an outlying hospital in the sector, operated on without delay, or given restorative treatment to fit them for operation in an hour or two. Those suitable for transfer would be taken at once to the evacuating department and sent off. Those requiring restorative measures would be taken to the resuscitation department to be put to bed by the nursing staff. Cases for operation would go to the fourth department and receive the care their injuries required. Where a single basement of sufficient size was not available the various departments would be in separate buildings, as close to each other as possible. Gravely injured patients would receive treatment according to their needs, surgeons and nurses would work protected from anything short of a direct hit, and cases for transfer would be sent off quickly enough to avoid congestion. A large number of beds would not be required, but those that there were would be placed in sufficient safety to give patients the sense of security for which they crave.

SHIRLAW gives the name classification evacuation points (C.E.P.) to these centres. His plan is doubtless imperfect, as all improvised plans must be, but it has obvious advantages over the existing system. The bombardment of London may last a long time and if we have put off making proper provision before the event nothing justifies delay now that we know what to expect.

1. *Lancet*, 1939. 1, 650.
2. Crome, L., Fisher, R. E. W. and Shirlaw, G. B. *Ibid*, p. 655.
3. Casualty Training and Organisation, London, 1940; see *Lancet* Aug. 24, 1940, p. 231.

CHRONIC MASTITIS

THE dependence of mammary growth and function on hormones has been amply demonstrated by experiment. The gonadal hormones, and artificial compounds with similar biological properties, are readily available and by their means the physiological activities of the mamma can be largely controlled. Clinicians have hoped, not unreasonably, that some of the pathological activities might be controlled by the same means. Changes closely resembling those of chronic mastitis in women can be produced in animals by œstrogens.[1] In women the exacerbation of pain and lumpiness in the mamma about the time of ovulation—that is to say when the output of œstrogen is at a maximum—leaves little doubt, when considered with knowledge derived from experiments on animals, that so-called chronic mastitis in women is attributable to a relative excess of œstrogen. One method of diminishing the output of œstrogen by the ovary is to supply testosterone, which reduces the output of gonadotrophin from the pituitary. Unfortunately androgens given in amounts sufficient to relieve mammary discomfort may have other effects which are undesirable.

On another page ATKINS gives in detail the results of treating 34 patients with testosterone propionate given by injection in doses usually exceeding 400 mg. during four weeks. Among these 34 patients 25 were benefited by the treatment so far as the breast condition was concerned, but hairiness, amenorrhœa and deepening of the voice were noted in 8 and menstruation was upset in others. In the goat and rabbit œstrogens have been found to be most effective when applied directly to the mamma.[2] MACBRYDE[3]

1. Goormaghtigh, N. and Amerlinck, A. *Bull. Cancer*, 1930, 19, 527; Lacassagne, A. *C.R. Acad. Sci. Paris*, 1932, 195, 630; Burrows, H. *Brit. J. Surg.* 1935, 23, 191.
2. de Fremery, P. *J. Physiol.* 1936, 87, 50 P. Lyons, W. R. and Sako, Y. *Proc. Soc. exp. Biol.* 1940, 47, 398.
3. MacBryde, C. M. *J. Amer. med. Ass.* 1939, 112, 1045.

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made a similar observation in women. SPENCE [4] has used this knowledge in his treatment of women with chronic mastitis. To eliminate psychological effects he first gave his patients, unknown to them, an inert ointment which they used for a month. The symptoms continued under this treatment and an ointment containing testosterone or its propionate was then substituted, a regulated amount being rubbed into the mamma every night. The doses of hormone so used ranged from 4 to 10 mg. a day, thus being considerably less than would be effective if given by injection. The 8 women treated in this way were all relieved of mammary pain, and none of them developed hairiness or amenorrhœa. Œstrogens appear to affect the mamma indirectly through their action on the pituitary. In spite of this fact there is experimental evidence that their action on the mamma is greatest when they are applied locally. From SPENCE's observations it would appear that the same is true of testosterone. Oddly enough, in view of what is known of the causation of chronic mastitis, beneficial results have been claimed for its treatment with œstrogen, but of the 33 cases treated by ATKINS with œstradiol benzoate or stilbœstrol 15 were rendered worse, amelioration was claimed by only 4, and 14 were unchanged. These results are in accord with expectations based on experimental knowledge.

The new work affords valuable guidance in the treatment of a condition which has been distressing to both patients and their doctors, for it shows a definite prospect of combating the symptoms by testosterone. A useful step now would be to improve the nomenclature. The machinery of the mind is impeded every time one is compelled by custom to apply the term mastitis to breast changes which we know are not mastitis. The pathology being now known, there is every reason for adopting the term "œstrogenic mastopathy", or some more euphonious version of it.

M.R.C. MEMO ON GAS GANGRENE

THE War Wounds Committee of the Medical Research Council have done a good job of work in publishing a concise account [5] of what gas gangrene is, and the methods by which it can best be prevented and treated, for few of the younger surgeons have much first-hand experience of this dreadful infection. The memorandum rightly emphasises that gas gangrene, principally an infection of muscle, is a clinical conception, so that the diagnosis must be made at the bedside and not in the laboratory. The spore-bearing anaerobes of the gas-gangrene group are often present in wounds where there is no gas gangrene, and as in diphtheria the clinician must learn to act on signs and symptoms and not wait for the bacteriologist's report. The acute onset and rapid progress are a feature of the infection, so that cases may be in extremis within a few hours of wounding, although as a rule the infection develops in wounded men who have been left unattended for 24 hours or more. The committee discuss the signs and symptoms, the quickening pulse, the local pain, the anxious look, the swollen limb with signs of gas-formation, and they warn the reader against relying on skin changes, which are variable, usually late and no indication of the extent of infected muscle, and point out the fallacy of X-ray diagnosis. If gas gangrene is a clinical conception it also depends for its occurrence—and this point is insufficiently made in the memorandum—on a combination of suitable conditions. It requires gross damage of tissues, having a high association with bony fracture, and a soil rich in the sporing anaerobes, but the most important single exciting factor is delayed surgical attention. The last fact is well illustrated by an American experience [6] in the 1914–18 war. Among 349 severely wounded and therefore non-transportable men who were operated on within 24 hours of injury there was no case of gas gangrene, whereas infection developed in 5% of some 4000 wounded men sent to an evacuation hospital with an average interval of 41·8 hours between injury and operation. For this reason, if for no other, it is supremely important to arrange for early surgical attention to air-raid casualties. That does not mean that a few hospitals in the near vicinity of the raided districts should be overcrowded, or that the injured should be evacuated wholesale to base hospitals, but rather that casualties should be dispersed in small numbers to as many hospitals as are within easy reach. The Spanish war demonstrated the wisdom of this policy.

The memorandum deals briefly with surgical prophylaxis and treatment, advocating ruthless excision of infected muscles but perhaps wisely avoiding any reference to the best method of amputation. As regards medical measures it recommends both the sulphonamides and antitoxin, particularly for treatment of the established case. Information is needed about the usefulness of the sulphonamides as prophylactics per se; possibly they act mainly by attacking concomitant aerobes which predispose to anaerobic infection. For treatment dosage by mouth is advised, but surely with the patient in a shocked state with absorption from the gut unreliable and the further risk of gastric upset, it is more rational to give the drug intravenously, if necessary in plasma or whole blood, or locally into the wound after surgical excision. Incidentally, either sulphanilamide or sulphapyridine is recommended, although experimental evidence suggests that the latter drug is much the more efficacious.

The memorandum concludes with a suggested scheme drawn up by the London sector pathologists for the bacteriological investigation of war wounds, with a brief discussion of the collection of specimens and the methods for identification of the common pathogenic bacteria in war wounds—streptococci, staphylococci and the gas-gangrene anaerobes. Litmus milk is recommended for the detection of *Clostridium welchii* although its activity as a gas-producer can be as readily detected in Robertson's meat broth. Why the objection to the screw-cap bottle for this medium? The identification of the anaerobes is the main difficulty, and unfortunately the table given will not help much. *Cl. welchii* apart, the recognition of the spore-bearing anaerobes by morphology and colonial appearance is a hard task, and it would be more useful to devise a scheme

4. Spence, A. W. *Lancet*, Sept. 28, 1940, p. 387.
5. Notes on the Diagnosis and Treatment of Gas Gangrene, M.R.C. War Memo. No. 2. 1940. H.M. Stationery Office. 3*d*.
6. United States History of the World War. Medical Department of the U.S. Army in the World War. Washington, 1929, vol. xii, p. 413.

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for the early identification of these pathogens by toxin-production and animal-pathogenicity tests. But everyone will agree with the committee on the need for keeping careful records which will provide more precise information about war-wound infections, supplement clinical data on the effect of various treatments, and secure evidence about hospital cross-infection.

SYNTHESIS OF A DISEASE

In 1869 JONATHAN HUTCHINSON described some curious skin lesions on the fingers, forearm and shins of a man. They were painless raised dark purple patches apparently formed by the confluence of discrete "tubercles"; they were irregular in their margins, smooth or finely scaly on their surfaces, and could be flattened by prolonged pressure. In 1889 BESNIER described this condition in greater detail and christened it lupus pernio. In 1898 HUTCHINSON published illustrations of a somewhat similar condition in which persistent raised dusky-red patches appeared in almost symmetrical groups on the two sides of the body. Ten years later BOECK of Christiania described this second condition more fully, clinically and histologically, under the name "multiple benign sarcoids of the skin"; he traced their evolution over a period of years, found analogous lesions in various mucous membranes, and noted that they might be accompanied by glandular enlargement. In 1914 SCHAUMANN of Stockholm showed that lupus pernio and multiple benign sarcoids have the same microscopic structure, and moreover that they are only two manifestations of an affection which may involve many of the viscera as well as the lymph-glands.

The new-formed tissue of the disease is the same in whatever site it develops. It consists of accumulations of epithelioid cells, interspersed with some lymphocytes and a few large giant cells, whose numerous nuclei are scattered throughout their cytoplasm; it fibroses as it grows old but it never caseates. It differs therefore from the tubercles which are evoked by the presence of the tubercle bacillus, and the long controversy about the tuberculous ætiology of the various lesions of this disease is now pretty well at an end. The disease is looked on as a peculiar reaction of the reticulo-endothelial system to an unknown stimulus. The disease affects the eye, producing the appearance of an iridocyclitis, which is often without further inquiry labelled tuberculous. Such an iridocyclitis, associated with fever and swelling of the parotids, was named "uveoparotid fever" by HEERFORDT in 1909; facial palsy may be incidental to it. Among the lymph-glands, any of which may be involved, with or without the spleen, the commonest site for the condition is the mediastinal group; their enlargement is apt to be regarded as tuberculous, if not even lymphadenomatous. In the lung sarcoids can occur, in large numbers and widely disseminated; they cast shadows that may easily be mistaken for those of miliary tuberculous lesions, though they are a little coarser, and they may cause breathlessness and cough. From the reticulo-endothelial tissue of bone-marrow sarcoids may grow, commonly in hands and feet; they cause bluish-red spindle-shaped swellings of digits, which resemble the truly tuberculous "spina ventosa," but on radiography show the punched-out areas in the phalanges called by JÜNGLING "osteitis tuberculosa multiplex cystica." In autopsies lesions have also been found in spleen, liver, intestine, testicle, brain, tonsils, and heart.

The disease may have an acute phase, with fever and increase of the red-cell sedimentation-rate, but mostly runs a very chronic course, tending after years toward spontaneous recovery. No treatment cures it. There have been several reviews of it published in the last few years, of which the most recent is by Prof. C. G. LAMBIE[1] of Sydney; he reports several cases of his own and cites an extensive bibliography. Professor SNAPPER'S lecture on it, given in London in 1937, has been published as a beautifully illustrated monograph.[2] The history of the condition is interesting, because its various manifestations, first described as distinct diseases, have been amalgamated into one "entity"—a simplification as welcome as it is rare in medicine. Its diagnosis is a pitfall to the one-track specialist; it may be missed by the dermatologist or the chest physician who ignores the eyes, by the ophthalmologist who does not inspect the skin or palpate the glands and the spleen, and by the radiologist who looks no further than his films. Yet its recognition is important, for it is commoner than is widely realised, and its prognosis is almost always better than that of the tuberculous lesions with which it is easily confused. Its troublesome aspect, at present, is nomenclature. Boeck's sarcoids or sarcoidosis is a common name for it. The Besnier-Boeck disease has official sanction from a dermatological congress. Professor LAMBIE recommends Besnier-Boeck-Schaumann syndrome (which seems hard on Jonathan Hutchinson), but he rightly points out that it will require the discovery of its cause, not merely its synthesis on histological grounds, to provide it with a satisfactory name.

BULLETIN OF WAR MEDICINE

In the last war the Medical Research Council (then Committee) brought out a monthly medical supplement to the Daily Review of the Foreign Press issued by the War Office. This supplement first appeared in 1918 and contained abstracts and summaries of foreign medical work. The council has now published the first number of a new *Bulletin of War Medicine*,[3] which differs from its predecessor in containing a survey of work done in this country as well as abroad. Fortunately for mankind medical science has no frontiers and the new journal is a reminder that throughout the world men share an enthusiasm for building up as well as breaking down. The abstractors are experts in the subjects they summarise which cover all branches of the science of medicine that may apply to war conditions. This number has sections on wounds and injuries, surgery of special regions, plastic surgery, anæsthesia, blood-transfusion, X rays, general and special diseases, psychological medicine, war gases and explosives, pharmocology, naval and aviation medicine, industrial hygiene, and food and drink, sanitation and civil evacuation. The bulletin does not cover tropical diseases or public health which already have their own bulletins. British, Dominion, American, German and French journals are passed in review and only rarely is the survey too general to be informative. It will be a great achievement to maintain this standard at bi-monthly intervals.

1. *Med. J. Aust.* 1940, 1, 815.
2. Snapper, I. and Pompen, A. W. M. Pseudo-tuberculosis in Man. Part 1. Haarlem. 1938.
3. Edited by the staff of the Bureau of Hygiene and Tropical Medicine under the direction of H. Harold Scott, M.D., F.R.S.E. H.M. Stationery Office. 2s. 6d.

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Annotations

TREATMENT OF BLAST CONTUSION OF THE LUNG

OCCASIONAL examples of contusion of the lung by high-explosive blast are probably being admitted to casualty hospitals, though no further cases have yet been reported since those of Allison and his colleagues,[1] and where they are diagnosed there will be some doubt as to the right treatment. All of them will be suffering from shock and most from severe burns, fractures or other injuries, and the chest condition will have to be borne in mind when planning the repair of other parts. In resuscitation it must be remembered that bleeding has been taking place from the capillaries of the pulmonary artery lying relatively unprotected in the walls of the alveoli, and if it has stopped it may easily start again. There is a danger that transfusion, whether with whole blood, plasma or glucose-saline, may add to the risks by promoting œdema of the lung bases. There seems to be good reason, therefore, for withholding transfusion, at least in the early stages, and combating shock by other methods, of which those which stimulate the peripheral circulation are probably the safest. Experience with bilateral pneumothorax treatment in tuberculosis has shown that a patient at rest in bed can get along quite comfortably with a very small area of functioning lung tissue, so that unless the contused area is extensive active measures of resuscitation are not needed from the point of view of opening up the lung parenchyma, though they may sometimes be necessary for cardiac stimulation. Continuous oxygen administration should have its place, more particularly if cyanosis is present. Posture is important. Blood from the contused area should be prevented from trickling down bronchi into the unaffected lung. The hæmorrhage, unlike that of pulmonary tuberculosis, usually affects the bases, and the best position for the patient is with the shoulders raised. If the bruising is unilateral he should be placed with the contused lung downwards, to prevent aspiration into the sound side. The use of morphia, so long an established practice in hæmorrhage, must here be approached with caution, and certainly the heroic half-grain doses given for hæmorrhage elsewhere are unwise. The deciding factor is the patient's mental condition, and a small dose to allay restlessness—not more than gr. $\frac{1}{3}$, repeated if necessary—is all that is required. There is clinical evidence that adrenaline is not free from danger where œdema of the lung is to be feared, and yet it might help to overcome temporary spasm of the bronchioles. Atropine to diminish exudation seems unobjectionable. Where an anæsthetic is essential it should be a local one or Pentothal.

The general principles of management, then, are the same as in bronchopneumonia, with additional precautions against hæmorrhage. Little is yet known about the later results of a contused lung in those who survive the initial shock. Secondary infection may follow, producing a condition clinically resembling postoperative pneumonia. Whether the affected base will ever function normally again is doubtful.

TIC DOULOUREUX TREATED BY DIATHERMY

THE usual treatment of trigeminal neuralgia, when the pain cannot be controlled by analgesics, is alcohol injection of the offending division of the nerve or of the gasserian ganglion itself. The success of this operation depends on skill, which only comes from much experience with the condition, and a detailed knowledge of the anatomy of the basis cranii and even in the best hands the results may be uncertain. Neurosurgeons have therefore devised alternative methods; open operation enables nerve section to be performed with certainty, and excision of the ganglion through a lateral approach to the middle fossa has become one of the more usual operations. If they are to be successful these methods must produce complete anæsthesia of the area. When the third division of the trigeminal nerve alone is cut little disability results, but when the ganglion itself is destroyed there is anæsthesia of the face, cornea and tongue, and sometimes the motor division is destroyed as well. The ungrateful patient then complains of the discomfort, suppressing memories of the excruciating agonies from which he has been freed. Moreover, such complications as ulceration of the anæsthetic cornea or a peculiar continuous pain sometimes follow alcohol injection. The subject has been closely studied by Harris.[1] To obviate these disadvantages Sjöqvist[2] devised an operation to cut the spinal tract of the trigeminal nerve within the medulla. This results in loss of pain and thermal sensation in the affected side of the face, with absolute preservation of the other forms of sensation, and is not associated with the risk of corneal ulceration. Obviously the task of cutting a tract in the medulla, however superficial, is not to be undertaken lightly, and the heroic procedure has been appropriately referred to as a young man's operation.

Eybers[3] claims that electrocautery of the ganglion produces more certain relief from pain with less undesirable sequelæ than alcohol injection. The procedure is similar to that used in injection, but the needle, except for its tip, is insulated in vulcanite. It is introduced into the ganglion by way of the foramen ovale, the anterior approach being as a rule the most favourable. An indifferent electrode is placed elsewhere on the patient and a small coagulating current is passed to the needle tip for twenty seconds. The cauterisation is repeated, and it causes degeneration of the ganglion cells with resulting relief from the pain. Eybers says that this relief is not associated with such profound sensory loss as with the other procedures. Unfortunately most authorities would agree that where any sensation remains the pain is liable to return within a few weeks or months. The method has been practised on the Continent in the last few years, especially by Kischner in Heidelberg, and although it is open to many of the disadvantages of injection it seems to be more certain and more readily controlled. Since their technique is so much alike the two procedures can be readily compared, and a follow-up will soon show which is the one of choice.

RECOVERY AFTER CEREBRAL COMPRESSION

MANY surgeons have had the disappointing experience of a patient failing to recover after the successful evacuation of a large intracranial hæmatoma. The brain sometimes fails to expand after the clot has been removed, and two such cases, both extradural hæmatomas, led Reid[4] to a study of the factors concerned in the expansion of the brain after the relief of compression. From a series of observations on cats he concludes that the most important physical factors are the degree of compression, the rate at which it has developed, and the length of time it has acted. As an important secondary effect, the return of fluid displaced from the cellular elements and the intercellular spaces plays a considerable part in the recovery of the normal bulk and contour of the brain. The brain will expand most quickly and completely when it has been compressed for a short time by a rapidly developing lesion which has not attained large size and has not displaced much fluid from the cells and tissue spaces. These are satisfactory explanations of delayed or incomplete expansion, but this may be only one of several factors which play a part in the fatal cases. In addition to the obvious compression by a large clot, and the failure of the brain to expand after the clot is

1. Dean, D. M., Thomas, A. R. and Allison, R. S. *Lancet*, Aug 24, 1940, p. 224.

1. Harris, W. The Facial Neuralgias, London. 1937.
2. Sjöqvist, O. *Acta Chir. Scand.* 1939, 82, 201.
3. Eybers, von W. *S. Afr. med. J.* Aug. 24, 1940, p. 324.
4. Reid, W. L. *Med. J. Aust.* 1940, 1, 885.

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removed, there may be the more subtle effects of the injury on neurones—effects which defy present pathological technique. There are fatal head injuries in which from naked eye and microscopic examination it may be impossible to say why the patient died. Nevertheless, the explanation of known facts will help to simplify the problem. Reid's conclusions argue for the relief of cerebral compression at the earliest possible moment, and if any additional evidence was necessary most surgeons could cite experiences of how rapidly a patient with an extradural or subdural hæmatoma can die even under observation in hospital, before facilities for operating can be mobilised. Diagnosis remains difficult, and too often the uncertainty arises from the lack of a thorough examination as soon as possible after the injury. Only by such an examination can a base-line be established on which to assess the signs of progressive cerebral compression.

SILK OR CATGUT

THE rival claims of suture materials are still unsettled and a surgeon's preference for silk or catgut often rests on a personal whim. Silk has the great advantage that it can be perfectly sterilised, but the great disadvantage that it remains a permanent foreign body in the tissues. Catgut cannot be sterilised by heat without losing its tensile qualities, and the chemical processes of sterilisation are not always perfectly reliable; nor is catgut so easily absorbed that it is not sometimes extruded as a foreign body, especially in the presence of infection. Nevertheless most surgeons nowadays prefer catgut. Daniel C. Elkin[1] is not one of these, and in a five-year study of wound infection at the Grady Hospital, Atlanta, Georgia, he finds evidence to support his preference for silk. All operation cases were classified as clean, potentially infected, or infected; the progress of healing of the wounds was carefully watched, and the development of the slightest signs of infection noted. Emergency operations done by the resident staff constituted the majority of cases. Silk was used in approximately two-thirds of the clean cases and 2·1% of these became infected. Catgut was used in the remaining third and 9·4% of these became infected. Catgut was used in the majority of potentially infected cases (such as compound fractures, wounds, and gangrenous appendicitis) and the number of these becoming infected was nearly three times as many as of those in which silk was used. On the face of it such evidence is fairly convincing, but the problem is not so simple as these few figures might make it appear. No-one would contend that the use of a particular suture material was the only or even the main factor in postoperative wound infection: Elkin himself mentions many of the other important factors when he describes Halsted's technique "based upon complete hæmostasis, clean dissection, the avoidance of mass ligatures, undue tension, and meticulous attention to every detail which eliminated tissue trauma," and he admits that his five-year inquiry "led to better care of the wound throughout the operative procedure." In these circumstances it is surely unjustifiable to give all the credit to the suture material even though silk came to replace catgut in the majority of operations. During one year the incidence of infection in "clean" cases was almost the same whether catgut or silk was used. This was because of the high proportion of infections among patients of one operator—a significant comment on the difficulty of interpreting statistics. These figures, however, even if they do not prove that silk is superior to catgut in allowing smooth healing of wounds, do at least show that given a careful technique silk may safely be used in contaminated wounds. In a discussion of Elkin's paper opinions were on the whole in favour of catgut. One surgeon, after using first catgut and then silk in thyroid operations, had finally returned to catgut. Another said "I took 100 cases and used silk, and a second 100 cases and used catgut, and in my hands catgut was far superior to silk," but he summed up the situation later by remarking "'Every one to his own liking,' said the old lady when she kissed the cow."

1. *Ann. Surg.* August, 1940, p. 280.

AN AZTEC HERBAL

ELEVEN years ago Prof. C. U. Clark, with his remarkable flair for discovering unique manuscripts, found in the Vatican library an Aztec herbal which, on the authority of Prof. H. E. Sigerist, who contributes a foreword to the translation,[1] is America's earliest medical work. The date is 1552, that is to say only thirty years after the Spanish conquest and almost contemporary with the famous European herbal of Dodonæus and a decade later than those of Fuchs and Gesner. The coloured illustrations of the Aztec herbal, though somewhat conventionalised and rather in the style of the Ortus sanitatis, represent 184 native plants and materially assist in the task of botanical identification, and fortunately the generosity of the Smithsonian Institution and other bodies, as well as of private individuals, has made it possible to embody a complete facsimile reproduction in colour of the manuscript with the translation. The manuscript was written by an Indian teacher of medicine, Martinus de la Cruz, in Aztec and translated by another Indian, Juannes Badianus, into Latin. Miss Emmart makes it clear that, unlike later works, the Badianus text represents Aztec medicine unmodified by European interpretation. The remedies, like those of contemporary European practice, were usually a mixture of many ingredients, on the principle that if one fails another may succeed. A good example is the remedy for "the fatigue of those administering the government and holding public office." This is composed of the bark of a tree, the leaves of twelve others, the flowers of eight plants, besides fruiting almond. To this was added the wood of hæmatoxylin, the blood of eight different animals, five kinds of precious stones, white clay, the bezoars from three different birds, also the brain and bile of seven other animals. Such a list of forty-seven ingredients rivals the receipts in the Saxon Leechbook of Bald. Some of the remedies were clearly in the nature of charms, and a belief in a "doctrine of signatures" is suggested by the use of hairy caterpillars as an ingredient in the remedy for falling hair. This doctrine was sincerely believed by many in Europe and led to the careful examination and observation of plants which laid the foundations of taxonomic botany, just as the search for the philosophers' stone and the belief in the transmutation of elements helped materially to advance the knowledge of primitive chemistry. Despite the superstition which was then characteristic of medical lore the world over, the Aztecs were fully aware of the value of the daturas as narcotics and used bocconia as an analgesic. *Ipomega purga*, one of the "jalaps," was used as a purgative, as at the present day, as also was *Cassia grandis*. Hæmorrhoids were treated by means of purgatives, intermittent fevers were recognised and their treatment, which included emetics, antipyretics and stimulants, was adapted to the course of the malady. The treatment of earache was a combination of astringent washes applied within, and external applications of datura. The pharmaceutical and botanical interest of this early manuscript is considerable, but despite the researches of Miss Emmart into later works and such assistance as the illustrations afford it has only been possible to identify with any certainty about a quarter of those figured although more than half can be tentatively identified. Now that the text is available further botanical research

1. The Badianus Manuscript. Introduction, translation and annotations by Emily W. Emmart. London: Humphrey Milford, Oxford University Press. Pp. 341. 53*s.* 6*d.*

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in Mexico will no doubt diminish the unidentified residue. Among the more interesting of the plants mentioned the root of smilax (sarsaparilla) appears in a remedy for scabies. Of the definitely recognisable figures that of *Theobroma cacao* is the earliest known illustration of the cocoa tree. Most of the plants are unfamiliar, but some are even found as natives of the Old World—for example, reed mace and milfoil—while not a few are cultivated garden plants, among them the red-flowered dahlia, the begonia and commelina.

PREVENTION OF SILICOSIS

SILICOSIS in coal-mines is not the pressing problem in the Netherlands that it is in this country, but Dr. A. H. Vossenaar,[1] chief medical officer of the United Collieries at Limbourg, views the two aspects of control—the condition of the worker and the conditions under which he works—from a long experience. He insists on the need for a preliminary radiographic examination of all underground workers, special importance being attached to the physical condition of those intended for work on rock, which exposes them to a greater risk of contracting silicosis. A re-examination every three years should include radiographic examination and an investigation to ascertain any predisposition to the effects of dust or to intercurrent diseases which would have an unfavourable influence. Vossenaar makes a definite plea for the limitation of the period of dangerous work underground. He puts this at 12–15 years of rock work, after which a change of occupation should be given, and he suggests that this condition should be made known to the worker at the outset so that he would not regard his transfer as meaning that his health was impaired. In discussing the technical procedures for the control of dust at the work places Vossenaar urges the importance of suppression of dust at the point of origin, whether by exhaust or wet methods. He recommends the use of masks when the dust cloud cannot be localised, as after shot-firing; the mask should fulfil the requirements of efficient filtering capacity, low resistance, small "dead-space" and good fit. He advocates good ventilation, improved mechanical loading and transport, wetting of broken rock and limiting of shot-firing to the end of the shifts, and it is now possible to assess the efficacy of such systems of dust suppression by estimating the numbers and size frequency of dust particles in the atmosphere. Finally Vossenaar points out that the general welfare of the worker depends on the provision of good conditions in his home as well as in his working environment, and the maintenance of his standard of living during disablement or unemployment.

Dr. Charles Badham[2] reports from Sydney the result of some investigations into the air-borne dust in tunnels and trenches in the highly siliceous sandstone on which the city stands and through which its system of sewers had to be hewn. In one tunnel, 5 ft. by 3 ft. 6 in., the concentration of dust was from 400 to 10,000 particles per c.cm. (as a rule the workers were exposed to several thousand particles per c.cm.) with a pneumatic pick and water blast in use and with the ventilating exhaust pipe 5 ft. from the face. Badham recommends an axial water-feed pick with improved ventilation and with the exhaust pipe one foot from the face. In a trench 10 ft. deep, working with a pneumatic pick on the hard sandstone floor of the trench, with the water disconnected, the concentration reached over 6000 particles per c.cm. within a few minutes. With water connected the concentration was 1596 particles per c.cm. The limit of safe working aimed at in Sydney is 200 particles per c.cm. at the breathing level of the worker. From the tests made it is evident that to attain even this arbitrary standard the utmost care is required in selecting the type of tool for the purpose, and in providing and maintaining correct and adequate ventilation. This means continued investigation at the actual working places by scientific methods and the application to each case of the results of the researches.

1. *Med. Off.* August 31, 1940, p. 69.
2. Annual report of the Health Department (division of industrial hygiene) for 1938, Sydney, N.S.W.

EMOTIONAL ADJUSTMENT OF THE DIABETIC CHILD

A COMMON belief that diabetic children are more intelligent than the average is not supported by the studies of McGavin and her colleagues[1] upon 49 children under the age of eighteen. The children were American born, 36 of them of parents born in the United States; the remainder were of mixed heredity, German predominating. The number of children in the families varied from 1 to 10, and it may be noteworthy that 17 of the children were the eldest and 15 the second child in the family, but the authors do not state how many families had only 1 or 2 children. In 8 of the children there was a paternal and in 9 a maternal history of diabetes; in 2 both sides of the family were involved. Of a pair of identical twins only one child was diabetic. The children on the whole were healthy; 2 died during the investigation, and 4 others developed ailments, 6 had physical defects and 2 visual defects.

Their intelligence was assessed by the revised Stanford-Binet scale, Ferguson form boards, the Metropolitan and new Stanford achievement tests, and the Rogers and Bernreuter personality tests. The mean intelligence of the whole group was 103 and the standard deviation 16·8; they were, in fact, neither significantly brighter or duller than non-diabetic children. A psychiatric investigation, however, brought out the striking fact that 32 of 45 children interviewed were maladjusted, and that while diabetes contributed to this maladjustment it was not the only exciting factor. The children admitted to feeling different from their fellows; some responded by aggressiveness, and others by retiring and seclusive behaviour. Out of 9 who felt ashamed of having diabetes 2 thought other children avoided them for fear of catching it. Only 1 boy felt his illness was a punishment, 2 girls were afraid they would be unable to marry, 1 thought it lowered her social prestige and 2 boys were frankly rebellious. Young children were less disturbed and more ready to accept their condition as a part of growing up; of 28 children who had accepted the situation 23 had developed diabetes before the age of seven. Maladjustment was common among those who were undersize for their age, 24 of them being more concerned about their stature than their illness. Intellectual backwardness made 5 children feel inferior, and social factors influenced others; the most intelligent child in the group felt inferior because she had some negro blood.

The parents in some cases seem to have been more affected by the diabetes than the child. One girl said that her mother loved her less since she had developed diabetes; and actually the mother resented the illness and was compensating for her feelings of guilt by extra fussiness over the girl's welfare. This tendency to excessive solicitude was common to several mothers, while others tried to make their children feel they were no different from others and sometimes overdid it. Several claimed that their children had changed as a result of diabetes, and others that the children were more irritable. Irritability could often be traced to hypoglycæmia, but in some cases it was a reasonable response to difficulties in the home. One mother blamed herself for the child's illness and regarded it as the cross she had to bear, which can hardly have made for happy relations with the child.

1. McGavin, A. P., Schultz, E., Peden, G. W., and Bowen, B. D. *New Engl. J. Med.* July 25, 1940, p. 119.

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Special Articles

PARATYPHOID OUTBREAK IN GLASGOW

BY E. BLOCH, M.B. Glasg., D.P.H.; AND
R. J. PETERS, M.D. Glasg., D.P.H.

(From the Public Health Department, Glasgow)

THE distinction between typhoid and paratyphoid was first introduced into Glasgow annual reports in 1925, and till the end of 1939 the average yearly incidence was: typhoid, 39; paratyphoid, 62.

In 1939 incidence was low with 11 typhoid and 48 paratyphoid cases, and during the first two months of 1940 only 3 typhoid and 2 paratyphoid cases were registered. Between the beginning of March and April 12, however, 304 notifications of paratyphoid were received; and 274 were finally registered as paratyphoid infections, of which 270 were treated in hospital. Only 1 typhoid case was registered during this period.

OTHER GLASGOW OUTBREAKS

A majority of the enteric cases registered in Glasgow have been sporadic and any recorded groupings have usually concerned institutions. Only two outbreaks in recent years, both localised, have been attributed to infected food. In the three years 1937–39 the peak months of paratyphoid infections were June, May, and January respectively, each peak being small. In 1936, however, 160 of the year's total of 195 registered paratyphoid cases sickened between Feb. 21 and April 27: at the same time 32 cases from Renfrew and smaller numbers from other neighbouring areas were reported. The 1940 outbreak resembled the 1936 one in being widespread and in not being traceable to a common origin, but it was more explosive in its onset.

COURSE OF THE EPIDEMIC

Onset.—In its rapid rise the outbreak also differed from food-borne outbreaks of enteric infection reported from other localities, but is reminiscent of the water-borne typhoid epidemic of 270 cases at Malton in 1932 (Shaw, 1933). The following table of incidence per week cites the two Glasgow outbreaks, the Malton outbreak, and, as an example of food-borne infection, the Liverpool epidemic reported by Frazer, Glover, and Glass (1937):—

CASES SICKENING IN SUCCESSIVE WEEKS

—	1	2	3	4	5	6	7	8	9	10	Total
Glasgow from 22.2.40 (untraced) ..	7	138	59	23	13	9	3	1	—	—	253 with symptoms
Glasgow from 21.2.36 (untraced) ..	7	19	24	34	34	20	6	4	9	3	160 with symptoms
Liverpool from 18.12.36 (bread)	4	34	45	27	9	5	6	1	1	—	132
Malton from 16.10.32 (water, typhoid)	1	78	64	58	26	11	6	2	1	1	248 notifications

Explosiveness of onset has usually been regarded as a characteristic of water-borne enteric outbreaks. In the water-borne epidemic at Croydon which comprised 310 cases, including 16 secondary cases, the rise was slower than at Malton but was termed explosive by the Ministry of Health (1937). The slow rise of the Hawick (1938) cream-borne typhoid outbreak was included in the arguments against a water origin.

Incubation period.—In 1937, in an institutional outbreak of 6 cases of paratyphoid in Glasgow the period of contact with a carrier before the cases sickened averaged 12·3 days and ranged from 8 to 16 days. In 1938, in an outbreak of 6 cases of paratyphoid in a Glasgow hospital, the intervals between the first contact with a carrier and the dates of sickening were: 9 days (1 case), 10 days (3 cases), 12 days (2 cases). In their report on the Liverpool outbreak Frazer, Glover, and Glass assumed an average incubation period of 12 days. Infection in our outbreak may, therefore, have begun as early as the second week of February or as late as the 19th. The latter assumption would make March 2 and 4 (on each of which dates 33 cases sickened) the twelfth and fourteenth days after infection. It would also imply an incubation period of 3 days for the first case. But Rundle (1929) noted records of such brief incubations and attributed them to massive dosage of infection. Murphy (1937) pointed out that, despite the size of the Croydon epidemic, only one incubation period was ascertainable with comparative certainty. In the present outbreak similar difficulties were encountered. The longest period between the removal of one case from a house and the subsequent sickening of another case in the same house was 8 days. In the 27 familial groups of 2 cases, the period between the sickening of the first case and the sickening of the second case was less than a week in 13 groups, and between 8 and 18 days in 9 groups; while in the remaining 5 groups the interval could not be defined. It was decided to regard an interval of 8 days or more as pointing to the likelihood of a secondary infection in a contact. The difficulty also arose whether to call the symptomless positive contacts primary or secondary. In such an outbreak, cases of primary infection without symptoms could be expected, but these carriers were discovered, through laboratory examination of specimens, some time after the discovery of the original cases in the group concerned.

DISTRIBUTION OF CASES

Geographical distribution.—Removals to hospital which reached a peak on March 19 began on March 4 and totalled 31 during the week beginning on that date. These 31 cases were derived from fifteen of the thirty-eight municipal wards, including four wards on the south side of the Clyde. Ultimately only three municipal wards remained immune—Calton, Kelvinside and Camphill. The first is a densely populated central ward, and the others are residential and more suburban areas. The south side was less affected than the north; with over a third of the city's population it yielded only 52 cases. The most heavily attacked area was a group of 3 wards on the northern riverside—Anderston (in the dock district) had the highest case-rate in Glasgow with 1·269 cases per 1000; Whiteinch (in the shipyard area) came second with 0·729 case per 1000; and Partick West (also a dock district) fourth with 0·613 case per 1000. Together these three wards had a case-rate of 0·856 (68 cases), while for all Glasgow the case-rate was 0·250 per 1000.

Institutional cases.—There were 4 institutional cases which came from three general hospitals. Two cases which came from one children's hospital appeared to be unrelated to one another. The 4 cases had been in the institutions long enough to warrant the assumption that they were infected within the institutions. The institutional population of Glasgow is given as 32,549, so that the institutional attack-rate was negligible.

House-distribution.—Of the 241 primary cases, 237 lived in private houses. The house-distribution of these cases was as follows:—

No. of cases in each house		No. of houses invaded	
1	5	164	1
2	8	23	1
3		2	
4		2	
			193

There were therefore multiple primary cases in 29 or 15% of the private houses invaded. Including primary and secondary cases, there were multiple cases in 43 of the houses invaded, or 22·3%.

In the Bolton-upon-Dearne water outbreak reported by Shaw (1922), including primary and secondary cases, there were multiple cases in 24·5% of the 94 houses invaded; and at Malton there were multiple cases in 15·4% of the 221 invaded houses. In the Croydon outbreak there were multiple

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primary cases in only 1·5% of the 274 private houses invaded. In that outbreak the incidence of typhoid fever among the consumers of the infected water was low (0·775%) as the population at risk was approximately 40,000. In his Malton report Shaw gave attack-rates for water-borne epidemics varying from 0·4% to 8%, including 2% at Bolton-upon-Dearne and over 5% at Malton. If our present outbreak was of water origin, then the attack-rate was even lower, namely, 0·025%, for it would have been necessary to suspect the whole of the city's water supply. Even if, owing to the relatively low attack-rate on the south side, the consumers of Gorbals water (a subsidiary south-side supply) be omitted, the attack-rate among the population supplied by Loch Katrine was still only 0·027%.

Size-distribution of homes.—The size-distribution of the homes of domestic cases appeared to correspond closely with the size-distribution of Glasgow houses as noted in the Housing Act Survey, 1935:—

—	1 apt.	2 apts.	3 apts.	Over 3 apts.	Total
Cases	25	126	78	41	270
Percentage ..	9	47	29	15	100
1935 housing survey percentages ..	13	44	28	15	100

A special scrutiny was made of the larger houses invaded—i.e., over three apartments in size. Of the 41 infections concerned, no fewer than 24 were comprised in 5 familial groups, so that the 41 infections occurred in only 22 houses. The majority of these 22 houses were houses of relatively low rental.

A spot-map confirmed that the epidemic selected the industrial and less well-to-do sections of the population.

Large familial group.—In a family occupying a five-apartment house 9 out of 10 persons were infected, the mother remaining healthy and returning negative specimens. The other 9 persons consisted of 8 multiple primary cases (one of whom sickened on Feb. 29 and the remainder on March 2) and a boy of 8 years who was a contact carrier.

Age- and sex-distribution.—The following table shows that male cases exceeded the female, whereas in recent years male cases registered in Glasgow have usually been considerably exceeded by females; during 1936–39 males formed only 34% of the total paratyphoid cases. Of the epidemic cases 72% were under 20. For 1936–39 the percentage under 20 was only 45% of the total cases.

—	Primary cases										
	−1.	−5	−10	−15	−20	−25	−35	−45	−55	+55	Total
Males	1	16	20	23	34	7	14	4	6	—	125
Females	2	16	14	18	30	15	12	6	2	1	116
—	3	32	34	41	64	22	26	10	8	1	241

In discussing water-borne and milk-borne typhoid, Hill and Mitra (1936) wrote—". . . variability in the proportional age- and sex-incidence is very great from one epidemic to another whichever the medium of infection. We find water-borne epidemics with a high proportion of adult females amongst the attacked, and similar epidemics with a high proportion of children. Conversely we find milk-borne epidemics with a low proportion of children amongst the attacked or a high proportion of adult males." These differences will depend on the age- and sex-distribution of the population at risk, as well as on the medium of infection. Nevertheless, it is of interest to note that while in the Hawick cream-borne epidemic 76 out of 107 cases (71%) were females, in the Croydon water-borne epidemic only 46·9% of the primary cases were females, and in the Liverpool bread-borne epidemic males exceeded the females.

CLINICAL FEATURES

Secondary cases and contact carriers.—Of the 253 clinical cases in this epidemic 12 (4 males and 8 females) were secondary infections. There were also 21 symptomless contacts (6 males, 15 females). As among the secondary cases, there was thus also a high proportion of females among the symptomless positive contacts. During 1936 there had been 27 contact carriers (10 of whom were registered) associated with 185 cases. If we include these symptomless contacts as secondary cases, we have the following percentages of total infections formed by secondary infections in various outbreaks—Glasgow, 1940 (untraced paratyphoid) 12%; Glasgow, 1927 (milk, paratyphoid) 14·1%; Glasgow, 1931 (ice-cream, typhoid) 8·7%; Malton, 1932 (water, typhoid) 12·96%; and Croydon 1937 (water, typhoid) 52%. These percentages, as one would expect, vary considerably irrespective of the medium of infection of the primary cases.

Clinical features and fatality.—As already reported by Peters (1940) and Anderson (1940) most of the cases showed a sudden onset with vomiting and diarrhœa, and stools either peasoup or green. Many showed rashes which were in some instances profuse. Half of the cases were pyrexial for less than fourteen days, and 17% had fever lasting more than three weeks. The characteristic complications of the disease were few—5 hæmorrhages, 2 perforations, and 1 pulmonary embolism. There were only 3 deaths, although over many years the death-rate in Glasgow for enteric infections has averaged 15% for typhoid and 5% for paratyphoid.

POSSIBLE CAUSES

Cases in other areas and associated diseases.—Towards the end of March, by which time there had been 250 cases in Glasgow, there had been about 140 outside Glasgow, mainly in the burghs of Paisley, Clydebank, Coatbridge, and in the counties of Lanark and Renfrew. In the 1936 spring epidemic there had also been increased prevalence in other parts of the west of Scotland, and the possibility of a seasonal factor increasing the infectivity of the organism was therefore considered.

The following figures for the sixteen principal towns in Scotland show that there was an associated increase of dysentery cases but no associated increase of diarrhœal deaths:—

—	Week ending—							
	2/3	9/3	16/3	23/3	30/3	6/4	13/4	20/4
Enteric fever ..	2	8	142	189	89	36	28	30
Dysentery ..	26	45	87	63	46	34	45	10
Diarrhœal deaths under 2 years	7	11	11	11	7	7	5	6

On the other hand, this increase in dysentery does not apply to Glasgow because the following are the vital statistics for Glasgow for the ten weeks beginning Feb. 18:—

Enteric registrations ..	—	—	6	8	2	11	3	5	3	7
Dysentery registrations ..	6	4	1	4	2	5	4	7	1	6
Diarrhœal deaths under 2 yrs.	4	4	5	9	6	4	6	3	3	6

It is, in fact, well known that enteric usually has its peak in the third quarter of the year although paratyphoid is less regular in this respect; autumnal peaks are also found in dysentery and non-specific diarrhœa, and it is quite against our previous knowledge of seasonal factors to expect a spontaneous rise in a diarrhœal disease during the spring months.

Food.—In conducting the food inquiries, the standard of proof sought was 60%. In the Liverpool outbreak 62% of the patients had consumed bread from the source under suspicion. At Hawick, out of 85 patients who were questioned, 83 had eaten cream often, including 78 who got their cream from one firm. The 2 patients who denied eating cream had worked in this firm's bakery.

Under the supervision of the divisional medical officers, a questionnaire was filled in for each Glasgow case giving the retail supply of several articles of food. The port sanitary staff, the food inspector, and the local food-control office coöperated with the epidemic staff in tracing the supplies to wholesaler, manufacturer, and importer. Inquiries were made regarding illnesses among the employees of many food-wholesalers and food-manufacturers: and visits were paid to several factories to inspect methods of manufacture. Patients were interviewed by medical officers of the public-health department to obtain information concerning food eaten away from home. Efforts were made to ascertain the connexions with Glasgow of cases sickening in other areas. The

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alteration of the distribution of common food-stuffs owing to war-time control was examined.

In no instance did the distribution of cases seem to be related to any known distribution of milk or other food, and the medium of infection could not be traced.

Water.—Although the undue preponderance of boys among the cases was noted at the outset and suggested inquiries regarding food-stuffs distributed to cheap cafes, yet the explosive onset of the epidemic also demanded an immediate scrutiny of the main water-supply of the city which comes from two sources, both unchlorinated. The sickening dates of cases pointed to infection in the third week of February: this was the date of the definite thaw following the severe winter (although a lesser thaw began in the third week of January). Although the condition of the water-supply might well have undergone considerable change by the time of examination, specimens were examined from the points of delivery into some households in which familial groups of cases had appeared. The results were all negative. All the chief water-mains in the city contributed to the water-supply of cases.

At the service reservoirs at Milngavie, fæces and urine were examined from all the workers and watchers, and examination for enterica was made of the water from the two reservoirs and also from an adjacent surface water basin. At Loch Katrine examination of excreta from the employees of the water department was carried out, and the effluents from the two sewage plants on the shores of Loch Katrine were also examined for enterica. Throughout all the water-works the health of the employees had been remarkably good considering the prevalence in the city of influenza during January. Neither the water nor the specimens from workers provided any basis for attributing the epidemic to water-borne infection. There had been a general water-shortage in the city due to burst pipes and consequent fall of water-pressure, and at one time the supply had to be increased from 75 million gallons to 85 million gallons per day. The areas which had been conspicuously short of water were not particularly affected with paratyphoid. Nor was it considered likely that the use of water-carts or of stand-pipes in the streets during the frost had been the direct means of spreading infection. Investigations of the water-supplies in the other areas affected were also negative.

Sanitation.—Inquiries at the homes of cases often elicited a history of defective water-supply during January or February, and in a minority there had been an associated defect in the soil-pipe system. In many of the cases, however, there had been no trouble with the water-supply or soil-pipe system throughout the winter. Moreover, the prevalence of insanitary home conditions due to water-supply difficulties antedated the epidemic by some days. Complaints began to reach the water department at the end of the first week of January and reached their peak at the end of the first week of February. Nevertheless, interference with domestic sanitation must have been widespread throughout the city, and the effect of this disturbance must have been aggravated by the blackout war conditions.

It was difficult to isolate either from the business records of city plumbers or from the records of the water department figures that would be an index to the amount of interference with domestic sanitation that had occurred year by year in the winter months. However, a scrutiny was made of abstracts of meteorological records from the year 1925. It was found that, till 1940, the early weeks of 1929 were the coldest of this century. The enteric infections in Glasgow in that year totalled only 81. However, the scrutiny also suggested that the first months of 1936 had been exceptionally cold and that snow and wintry conditions had been prolonged into the spring. It was in 1936 that the other considerable untraced paratyphoid epidemic had occurred. The mean temperature for January and February in 1929 was 33·3° F., in 1936 was 35·2° F., and in 1940 was 32·5° F. The other years from 1925 ranged from 36·0° F. to 41·5° F.

DISCUSSION

In 1940 and 1936 large paratyphoid outbreaks have occurred with the characteristics of spread from a common source but untraced to any common origin. They were accompanied by untraced outbreaks in adjacent areas which appeared to be unrelated to the outbreaks within the city. The Glasgow outbreak in 1940 was of remarkably explosive onset and it is a matter of some concern that efforts to reveal its origin have failed. Whatever this origin may have been, some factor was obviously at work that was strong enough to operate despite the wintry season, for the normal seasonal incidence of diarrhœal diseases is autumnal. If it be assumed that as in droplet-borne diseases there exist many temporary as well as chronic carriers, it might be submitted that this epidemic originated in multiple, widely scattered foci suddenly assuming high infectivity. Yet several cases who remained at home undetected for periods up to two to three weeks yielded no secondary cases so that case-to-case infectivity was apparently low. The results of laboratory investigation of excreta examined for other purposes also suggest that the paratyphoid carrier-rate in the general population showed no increase.

The outstanding collateral environmental circumstance was the great frost with its consequent interference with domestic water-supply and drainage, though infection was not confined to houses whose water-supplies and drainage suffered interference. Most of the cases arose in small houses in the more densely populated industrial areas, where apart from increased opportunities of spread of infection from person to person, probably there was also an enforced degradation in standards of personal hygiene. The outbreak shows the threat that may reside (even in a locality where enteric infections have long remained within "residual" limits) in a temporary deterioration of the sanitary environment. The blackout must have aggravated the general sanitary disturbance. There is some evidence that the weather at the beginning of 1936 was of exceptional severity and there was, no doubt, disturbance in the sanitary environment then, though less than in the first months of 1940.

SUMMARY

Glasgow has experienced its second untraced and considerable spring outbreak of paratyphoid within five years. There were 274 infections, of which 12 were probably secondary and 21 others were asymptomatic.

Features of the outbreak were:—

Its explosive onset with 138 cases sickening in the second of its seven weeks' duration.

The excess of males over female primary cases.

The unusually high proportion of cases aged under 20 years (72%).

The high proportion of invaded houses with multiple infections (15% for primary cases, 22·3% for all infections).

The almost complete limitation of the epidemic to the less well-to-do sections of the population throughout the city.

The concurrence of apparently unrelated outbreaks in surrounding areas.

The failure of investigations to reveal its origin.

The weather in the early months of 1936 and of 1940 was exceptionally severe. The effect of the weather on sanitary conditions in 1940 was aggravated by the war-time blackout.

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WITH a view to avoiding the importation of glycerin British producers have instituted a system of rationing for supplies to manufacturers and wholesale distributors. They are discouraging the use of glycerin in the manufacture of tooth-pastes and toilet articles generally and are reducing the amount released for medicinal purposes. An official medical committee is now investigating the question of substitutes, and in the meantime doctors should avoid the prescription of glycerin where possible. The rationing does not imply that there is any danger of a dearth of glycerin; it is simply intended to limit home consumption to home production.

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WAR AIMS

A NUMBER of men and women, more or less prominent in the political world, have lately set out their views as to the kind of world order they would establish after the war, if they had their way. Their book[1] illustrates the difficulties of speedy action by democratic methods; for, while all the writers are agreed that we should be prepared with clear and definite ideas as to the uses we shall make of our ultimate victory—our peace terms and our post-war aims—they are far from being in agreement as to how this shattered world may best be remoulded nearer to the heart's desire. Some readers will be inclined to echo the celebrated opening phrase of the cookery recipe attributed to Mrs. Glasse: "First catch your hare." Others, more complacent, will say that our only job at present is to smash Germany, and then to let things settle themselves. It is certainly unfortunate that so many of us are actuated by ideals and motives that are mainly negative, protective, preservative; whereas those of our opponents are positive, acquisitive.

The contributors to this symposium are comparatively young; that is to say, they were born in the present century. All the political parties, except the Communist, are represented. The editor himself is a Conservative, as is also Major Victor Cazalet; Sir Richard Acland is a typical modern Liberal; while the Earl of Listowel, Mr. John Parker and Mr. Richard Stokes are prominent members of the Labour Party. The two women contributors are the Baroness Ravensdale, eldest daughter of the late Lord Curzon, and Miss Irene Ward, Conservative member for Wallsend-on-Tyne. Two of the freshest and most stimulating essays are those of Mr. Stokes, who is a Socialist and a Roman Catholic, and Mr. David Astor, who is still in his twenties. But here is a quotation from the contribution of Captain Alan Graham, incidentally the oldest of all the writers, being in his forties and therefore getting nearer to the de-bunking age. "We were told in 1914, as we are told today," he says, "that it was for 'democracy' that we were fighting and against autocracy, and yet we had for our faithful ally the Russian Tsardom, while the German Social-Democrats, having voted in 1913 for that year's colossal increase of the army of the German Empire, continued to support it as long as ever it looked like winning! In those four years of war the average British soldier was certainly not consciously dying for 'democracy,' whatever epitaphs demagogues may have placed upon his memorials. The average British soldier of 1914–18, if able to give any articulate reason as to why he was then fighting, would have said 'to stop Kaiser Bill from bossing the world!' In other words he was, although most probably unaware of it, fighting for British against German Imperialism. He certainly, unless singularly ignorant of human nature as well as of all recorded history, could not have imagined that he was fighting a 'war to end war,' the other popular and equally unreal slogan of those days."

In certain well-to-do and influential circles there is a hope that after the war we shall be able to return to the way in which we lived in 1913, or at any rate in 1939. Fortunately that is impossible. The leading article in the *Times* of July 18 recognises this.

> "In the European order of the past 20 years Hitler finds one of his easiest targets. . . . He finds another in the contradictions of our social and economic system. German propaganda in recent weeks has been treading familiar ground. The chronic unemployment, the inequalities of social privilege and vested interests, the burning of wheat and coffee while men went hungry, the senseless accumulation of gold in Fort Knox, Kentucky. . . . Much harm may be done to our cause, both in Europe and overseas, by the insinuation that we stand for the old order and that our only aim is to restore the status quo in Europe and to maintain it at home."

> Ægrotat Dæmon, monachus tunc esse volebat.
> Dæmon convaluit; Dæmon ut ante fuit.

True patriotism is not to be confused with that egoistic nationalism which is at the root of the present war, as of most other wars. Rather is it a kind of pride and affection which make a man not only delight in his country's glory but also wince at her shame. Our concern is primarily with that country whose course alone we are called on to direct. As Pythagoras said, "The best thing we can do for a child is to make him the citizen of a country with good institutions." England has a character, a tradition, a personality as distinct as are the qualities of individual men and women. Real patriotism will endeavour to give full expression to this personality, while respecting as of equal value and having equal claims the personalities of all other nations. But a policy for England should be a genuine English policy—not a French or a Russian or a German one.

There must be no narrow bigotry and inhospitable exclusiveness in our definition of who are the English. They are the people, whatever their racial source, who have made England their home. Let us exclude whom we will; but once having admitted a man or a woman to citizenship, we must show our dignity and national good breeding by henceforth regarding him or her as one of ourselves. Our laws, it is true, still make no distinction; but some of us manifest a smaller spirit. Let the true-born Englishman consider the blood of which he is made—Celt and Dane, Teuton and Norman, Dutch and Huguenot. England is able to assimilate them all. It seems, indeed, that England can make English people of all who come.

1. After the War. A Symposium of Peace Aims. Edited by William Teeling. London: Sidgwick and Jackson. Pp. 198. 12s. 6d.

ECONOMY IN ESSENTIAL DRUGS

MORE HINTS TO PRESCRIBERS

ANOTHER series of recommendations of the advisory committee (see *Lancet*, Sept. 14, p. 340) deals with drugs which they consider essential for certain purposes but whose use should be restricted. In their opinion boric acid in boric lint is wasted. Stocks of agar should be reserved for bacteriological media, and for other purposes ispaghula should be prescribed instead. A substantial volume of alcohol would be saved if tinctures were replaced by concentrated preparations. The limited supplies of orange peel which are available for galenical preparations should be used with strict economy. Where possible aluminium hydroxide, magnesium trisilicate, kaolin or chalk should be prescribed in place of bismuth salts. Borax should be used sparingly. Caffeine should be omitted from compound tablets such as compound aspirin tablets, and elsewhere nikethamide, leptazol and amphetamine can partially take the place of caffeine and sodium benzoate.

The committee suggest that capsicum should only be used in the manufacture of capsicum wool and that for other purposes mustard should be substituted. Cloves should be reserved for the distillation of clove oil. Dioxyanthranol is recommended in place of chrysarobin, proflavine or acriflavine in place of iodoform, and proflavine, acriflavine, trinitrophenol, crystal violet or brilliant green in place of iodine. They say that preparations of ipecacuanha as expectorants and emetics are not essential and advise that in allocating supplies of ipecacuanha preference should be given to the manufacture of emetine. Jaborandi should be reserved for the manufacture of pilocarpine and for most purposes physostigmine should take its place. As substitutes for santonin the committee propose hexylresorcinol. Concentrated solution of ethyl nitrite is recommended for spirit of nitrous ether. The use of all syrups should be discouraged and compound syrup of iron phosphate should be reserved for children. Sodium salts should be substituted where possible for potassium salts, the compounds specially mentioned being the bicarbonate, bromide, chlorate, citrate, hydroxide, iodide and permanganate. Economy is called for in the salts of mercury—the subchloride, oxycyanide, perchloride, yellow oxide and red oxide—because the metal has to be imported, and phenolic antiseptics of the chlorinated phenol type are suggested as substitutes for corrosive sublimate. Sodium salts should be prescribed where possible for magnesium carbonate, oxide and sulphate.

The importation of cinchona, the committee say, should be restricted to the supplies required for the manufacture of quinine and its use as a bitter should be avoided. Production of cinchona within the Empire should be encouraged, as should that of cascara sagrada and liquorice.

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which should be used sparingly in the meantime, Substitutes for glycerin are under investigation. Indian podophyllum (*P. emodi*) is recommended instead of the American drug (*P. peltatum*), and quillaia should be employed with care. In the committees' opinion oil of chenopodium is not essential in Great Britain and they suggest thymol or carbon tetrachloride as substitutes. Economy is called for in certain substances, which are under government control—malt extract, cod-liver oil, olive oil, honey, soft paraffin, liquid paraffin (whose "use should be discouraged"), lanolin, benzoated lard, starch, dextrose, acetone, citric acid, tartaric acid, cream of tartar and sodium citrate. Vitaminised oil is recommended in place of cod-liver oil and arachis and other vegetable oils in place of olive oil. Where liver extracts are required the committee say that injection is the most economical and effective method of administration.

In England Now

A Running Commentary by Peripatetic Correspondents

WHEN I joined the E.M.S. a year ago I asked for a tin hat, since I saw that the clerks in the hospital to which I was then attached all had them; they were not, like the doctors, expected to go out in emergencies. I was told that they would be provided in time when more became available. I have asked again, at odd times, but always received the same answer. I must admit, however, that I did not ask sufficiently to make myself unpopular. With the onset of this blitzkrieg I thought it wise to ask once more as firmly as possible. Before I did so I enquired of the other doctors practising in the same house if they possessed them; none of them did. A fair cross-section of those in my immediate vicinity, therefore, had not been able to obtain hats. In answer to my demands, my sector officer wrote and told me that no tin hats were available and advised me to buy one from one of the big stores. Not only have they sold out at the present moment but there is no guarantee that the tin hats they sell are as good as the service ones. I saw the advertisement advising medical men to obtain tin hats from their local war committee so I went to 31, Harley St. and asked the receptionist to put my name down on the list. I was told that I should have to wait, because 1000 Home Guards had to be provided with them first. In the meanwhile, a house opposite the flats where I live was bombed one night and collapsed with a man under it. I stood by for some five hours, without any protection whatsoever, waiting to give this man attention. I have asked other people if they have tin hats, but only one doctor has told me that he has had one issued from his sector. Yet I see that every W.A.A.F., every A.T.S., every shelter marshal has a tin hat and even civilian members of the B.B.C. have tin hats. These people have no necessity to go out in raids. A doctor is worth less than a cook in the A.T.S. apparently. I have paid my seven-shillings-and-sixpence to the local war committee and the local secretary has written to me telling me that the list is really closed but a supplementary list is being prepared. In the meantime my head is to be exposed to any odd piece of shrapnel dropping from the skies.

* * *

A great drawback to one-earedness is that one loses all sense of the direction of sound. I find this particularly galling now when one so often wants to see the aeroplane one hears. I can only approximate to the direction by rotating slowly and finding where is the loudest noise, a clumsy and undignified method. Probably I have had one stone-deaf ear since early childhood, although almost incredibly it was not spotted by me or anyone else till I was eighteen. I have compensatory acuteness of the other ear, so that no-one notices it, although they often notice my manœuvres to get into a good strategic position. One result of the compensation is that I am very sensitive to noise; I cannot concentrate if people are talking, for the good ear has been trained to demand all my attention. It has an increased awareness, and when its owner is walking along a country lane it is able to distinguish the rustlings in the wind of the different species of trees. At night if one turns on one's good ear the world of sound is nearly blotted out, and that's a great advantage. One also gets a faculty for reconstructing a sentence from a word or two and the intonation. Sometimes one makes a howler. At dinner on board ship I was left alone with a lady who waxed confidential. "You know, my husband was a great . . . ." I guessed "gardener" or "golfer," and said "How jolly." She drew herself up, "It wasn't jolly at all—he was drunk on my wedding night, and I've never smiled since."

A mechanism I have never understood is that by which, if you are watching a person's mouth, you can better hear what they are saying—or singing. If you watch one of the choir in church, for instance, you seem to hear him almost to the exclusion of the others. It can't be lip-reading for Edward Grey had the same experience when watching a spotted flycatcher through binoculars, and I have often confirmed this with other birds.

* * *

On Monday Nannie remarked at breakfast that the purchase tax started tomorrow and if we wanted any shoes or stockings or a new hat we had better get them today. There was some discussion on the ethics of this course. Was it quite nice to do the Chancellor down when it seemed so easy, particularly since the shops had patriotically avoided mentioning the tax in their advertisements? In the end we bicycled into the town, and in company with many others bought a pair of shoes each and a supply of socks. But none of us felt very proud of it, and it was a relief on Tuesday to read in the *Times* that the tax would be brought into operation as soon as possible but the date had not been fixed.

* * *

A small boy took a puss-moth caterpillar to church in a match-box; it escaped; he was reproved; feeling that kindness to animals would appeal to grown-ups, his excuse was that he thought it would enjoy the outing. It is difficult to share mental pictures with others, one can only do it with words, which are coarse brushes and paint differently with other people; but by bribery, patience, and by casting off for a little while the crust of years I did get a glimpse of what was going on in that boy's mind during that Sunday service.

Two preliminary episodes must be recounted. The first is that some days before he had watched men shooting driven partridges; they were dressed in plus fours, one of them at any rate was smoking a cigar, and they were such deadly, nonchalant shots that they made a vast impression on him. The second is that in the school chapel in the previous term a preacher had said that if you look for the nasty things of life you will always find them and find little else, and had illustrated this by pointing out that if you listen for the sibilants of the esses in song or speech, you will hear them and them alone. The boy, discarding the moral, had pounced on this interesting discovery. Well, there we are. All an outsider would have seen was a small boy in church, his hot hand clasping a match-box in which the movements of his pet caterpillar, Buddy, could faintly be discerned. Really, what was happening was that he and Buddy, both in plus-fours and smoking cigars, were shooting sibilant partridges which were coming over in enormous numbers—"the scripture moveth us in sundry places," for instance, is two brace—and were shouting to each other "O, good shot, Buddy," "O, splendid right and left, Archie!" I gathered neither of them ever missed.

* * *

The Greeks had no word for it but the Romans called it Coccium. Did they laugh inanely at one another when Coccium cropped up in the conversation, as many people do now when the town is given its modern name—Wigan? I rather think they did. There seems to be something intrinsically funny about both names, and so the ancient town has suffered by a doubly unkind dispensation of Providence. Music-hall artists throughout the English-speaking world recognise in the mere mention of Wigan an unfailing source of merriment, and no matter whether his audience be in the metropolis or the Antipodes or where you will, the comedian can depend upon this gag eliciting convulsive laughter. Wigan can claim a link—a slender one perhaps—with the Royal College of Physicians of London. The founder of the college was Sir Thomas Linacre, and he

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seems to have had some connexion with the town, for Wigan grammar school library is known as the Linacre Library and one of the school houses is called after him. What his association actually was with Wigan remains obscure, and I imagine that we should look in vain for enlightenment in the early minutes of the college, although the erudite director of the Wigan public libraries might have been able to provide Professor Topley with some useful information for his Linacre lecture. But it is of no avail for Wigan to call up the giants from its long and illustrious past to defend it against the mockers. "We are all good and bad in parts," says Dean Inge, and the same applies to towns, including Wigan, but such is this town's comical name that men will continue to laugh at it "till time and times are done."

Parents ambitious for their children should consider not only the names of their offspring but also the names of the places in which they are to be born. What an asset it must be to claim for one's birthplace a town with a beautiful name, and such names abound in England. Think of Sevenoaks, Melton Mowbray, Leamington, Malmesbury, and Shrewsbury. These are the names that tumble about one's ears to the music of Edward German and the prose of Mary Webb. And what is written here of England could easily be applied to other parts of Britain. I remember a woman medical officer at a Birmingham fever hospital confiding in the mess that "she was nearly born in England." The expression of relief at disaster narrowly averted was easily explained, for in spite of her English domicile her inflection left no doubt in the mind that Scotland, aye and Glasgow too, claimed her for their own.

* * *

I was doing a locum in a lovely English village. The children played on the village green and red chestnuts blazed beyond. The telephone goes. The local policeman speaking. Can he bring a girl and her mother up? Assault case. A girl of twelve and a woman come into the surgery, where the child tells of a hedgerow seduction by an ice-cream vendor. She displays neither shame nor horror, but talks impersonally and mechanically as though reciting "The Charge of the Light Brigade." I find one small bruise, vitally placed. The woman draws me aside. "I'm not really her mother—just her foster-mother, but she doesn't know." If I had been more astute I think I might have guessed that; too much detachment between these two.

The gardener here and I have become "soil brothers." I got him some Glastonbury thorn to bud on his hawthorn, so that they will bloom in December. I mention that because he tells me the other side of the story which he got via the boot boy via village boys still at school. This ice-cream barter had been going on for some time. The boys were furious because the girls had feasts without payment of money. They talked and it got to the ears of the policeman, but he couldn't do anything until he got evidence. Finally this girl informed, not because of her injured modesty, but in anger and revenge because the man had tricked her. At the police-court in the county town, where a very dapper inspector was definitely the master of the ceremonies, I saw this monster of the stop me and buy one brigade. He was 43, a poor dilapidated little rat of a man. I gave my evidence. Yes, the bruise might have been caused like that. Could it have been caused bicycling? Yes, but I should say it's unlikely. There were two magistrates and I noticed that one of them was looking at me—well, admiringly. It gave me confidence. Later the P.C. gave his evidence and I noticed that he too was being gazed at with admiration. Then I saw the magistrate raise his arm. Idiot—he had paralysis agitans and the admiring gaze was Parkinson's mask! The inspector made the presiding magistrate say that the prisoner would be remanded so that his mental state might be looked into. "Can I have bail, mister? It was all the girl's fault. I'll be a good boy. Can I have bail, mister?" It was the cry of an urchin of ten and I should think his mental age was less than the girl's.

I had an evening visit from the parson, much upset—terrible thing to have been going on in his village. In a way he felt personally responsible. I sought to assuage. In growing up we go in synopsis through the history of man, and the stage just before puberty is like the stage just before civilisation. I can well imagine the Iceni women selling their charms to the Roman legionaries for ration or ornament. I don't believe he listened to me, he was too distressed. "But many of these children are in my Sunday school and come from really nice homes. To me it's absolutely incredible." Yes, two or three thousand years takes a lot of bridging.

I left that locum soon afterwards, having been bound by oath to come back if the case went to assize. I never heard anything more about it officially, but a few months later I was driving through that country town, and saw that dapper inspector on the pavement. I went up to him, told him who I was, and asked him about the case. "We get so many of these cases I'm not really quite sure," he said doubtfully. "O yes, I remember. They couldn't bring him in as mentally deficient and I think he got four months." There is no point or moral in this story, but I think it still is one of the most picturesque villages in England.

AIR-RAID SHELTERS SCRUTINISED

THE breathless activity of the committee on conditions in air-raid shelters should give the lie to the belief that we are a dilatory nation. The committee was appointed, under the chairmanship of Lord Horder, on Friday, Sept. 13, and completed its survey and presented its report by Wednesday, Sept. 18. The other members of the committee were Dr. M. D. Mackenzie, a medical officer to the Ministry of Health, Mrs. Creswick Atkinson, R.R.C., technical adviser to the Women's Voluntary Services, Sir Wyndham Deedes, chief warden of Bethnal Green, and Sir Alexander Rouse, chief engineer to the Ministry of Home Security; Mr. F. G. Downing, of the Ministry of Home Security, was secretary. The recommendations of the committee are being implemented by an interdepartmental committee of the Ministries of Health and Home Security, under the chairmanship of Mr. William Mabane, parliamentary secretary to the Ministry of Home Security. The recommendations of the Horder committee were chiefly concerned with overcrowding, and the control of shelters from the medical point of view. Sir Edward Evans, London Regional Commissioner for Civil Defence, has been appointed to supervise the improvements in London's shelters which are now being put in hand.

MEDICINE AND THE LAW

Miner's Nystagmus

PREDISPOSITION to nystagmus was discussed in a recent case in the Lichfield county court. Shotton, the applicant, had been certified as suffering from the disease in 1937. Four months later he registered at the employment exchange and eventually obtained work as a commissionaire. He continued to receive £1 a week compensation till March, 1939, when an examination indicated that he had recovered inasmuch as there was no oscillation of the eye-balls. The respondent employers, the Cannock Chase Colliery, then gave notice to terminate the payments. Medical evidence for the applicant stated that there was an increased susceptibility to nystagmus; Shotton himself said that, if he bent down and rose quickly, an attack of nystagmus would follow. On the other hand the medical witnesses called by the employers distinguished the true case of susceptibility to second attack from the other cases where there was no such susceptibility but where a second attack might be induced by some extraneous cause such as domestic worry or influenza. They placed the applicant in the second class and said that recurrence would not be due to the original attack. The judge referred the case to a medical referee. On the latter's report that Shotton was now free from the disease, and that any fresh attack would be due to defective nerve control, the court declined to make an award.

Mr. C. W. MAUDSLAY who has retired from his post of principal assistant secretary to the Board of Education will continue in part-time employment, visiting areas where the proposals of the local education authority for the provision of meals and milk for school-children do not appear to meet fully the needs of the area.

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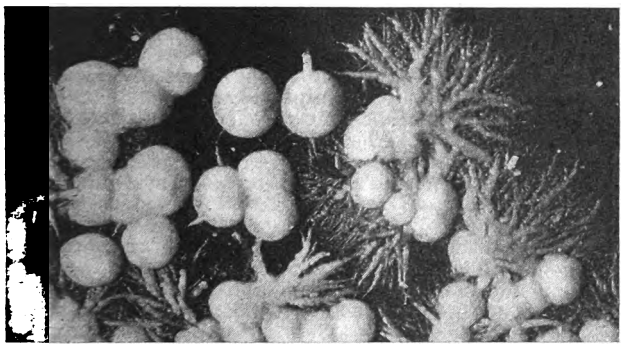
Letters to the Editor

VAGINAL DISCHARGE

SIR,—I was extremely interested in your leading article of Sept. 7, particularly with regard to monilia infection.

At both my venereal-disease clinics at the Royal Free Hospital and the Salvation Army Mothers' Hospital many patients attend for examination of vaginal discharge in pregnancy and for some years a condition has been observed which is undoubtedly a clinical entity. A number of patients complained of discharge accompanied by soreness and irritation—at times intolerable irritation robbing the patient of sleep and rest. On examination, as I have implied, most of these patients were found to be pregnant, but with increasing recognition of the condition not all; the condition does occur in non-pregnant patients, but much more rarely. There is soreness, redness and sometimes swelling of the vulva, the soreness and redness extending in severe cases to the perineum and groins and even progressing to excoriation. There is no sign of infection in the urethra, Skene's ducts or Bartholin's ducts, and on passing a speculum the vagina and vaginal fornices are found coated with a thick pasty or cheesy discharge varying in colour from white through shades of yellow to a pale green; through this discharge appear the bright red rugæ of the vaginal walls, except in the few cases in which the discharge forms a semi-solid mass filling the whole of the vagina. When the discharge is swabbed away the cervix is found not to share in the inflammatory process. The condition is more frequent in hot weather, and fair-skinned women are more often and more severely affected than dark.



Vaginal secretion; 3 days' anaerobic culture. Thomson's medium ×20. Shows two varieties of monilia colonies.

From a particularly severe case at the Salvation Army Mother's Hospital I sent specimens to Dr. Thomson of the Pickett-Thomson Research Laboratory and quote his reports (Oct. 30, 1939).

Direct examination (gram-stained smear) shows epithelial cells and some pus cells and large numbers of secondary organisms—chiefly diphtheroids, staphylococci and some small gram-negative bacilli. Fair numbers of yeast-like cells and mycelium are present.

Dark-ground examination negative for *Trichomonas*.

Culture.—Shows a heavy and profuse growth on blood-agar and hydrocele agar of a yeast-like mycelium.

I am sending you slides of (1) direct examination, and (2) cultural, as they are interesting and striking. The presence of these yeast-like organisms is suggestive of the condition being due to a mycosis. Strange to relate I found the attached cutting in the *Journal of the American Association* which just arrived this week and entirely corroborates this (*J. Amer. med. Ass.* 1939, 113, 1508).

In December Dr. Thomson kindly sent me the accompanying photograph of the culture from this case showing two varieties of monilia colonies.

I have found these cases respond very well to treatment with vaginal Stovarsol; if the patient can easily attend hospital I order a low-pressure douche of sodium bicarbonate (1 drachm to the pint) with the insertion of 1 stovarsol tablet and a small tampon; if daily attendance is difficult the patient is instructed to bathe the vulva with the solution of bicarbonate of soda and to insert the stovarsol tablet after lying down in bed and after having carefully cleaned her fingers and hands. When there is much vulval irritation I order a lotion of 3% phenol in boric, but in the majority of cases this is not necessary since the response to stovarsol is immediate. It is a pleasure to see these patients a week after treatment has been instituted—the soreness and irritation have gone, and the patient can walk in comfort and sleep in peace.

I must add a word of warning. As a rule the relief is so great and so immediate that there is a tendency on the part of both patient and medical attendant to give up treatment too quickly. In the majority of cases I prescribe vaginal stovarsol nightly for two weeks, then drop to one tablet on alternative nights for three or four weeks, and then one as required for four to six weeks.

A great many of the cases have been examined after delivery when no signs of the infection can be found.

Dr. Matters refers to the staining due to Bonney's blue paint, but I have found the same objection to silver picrate.

I would like to express my appreciation of the interest shown by Dr. Thomson and my thanks to many medical officers in charge of antenatal clinics who have sent me patients.

Harley Street, W.1. MARY MICHAEL-SHAW.

SIR,—I have read with interest the review of Matter's paper on vaginal discharge in your leader of Sept. 7. With regard to so-called monilia vaginitis, you say that "it remains to be seen whether this fungus is a common cause of vaginal discharge in the British Isles." In my experience it is a common cause and is only considered uncommon because its clinical features and method of diagnosis are unknown, even to many gynæcologists.

During a year's work on leucorrhœa, I became particularly interested in "vaginal thrush" and met with many cases. The results of the work have been published in collaboration with Colonel W. Glen Liston (*Edin. med. J.* 1940, 47, 369; *J. Obstet. Gynæc.* 1940, 47, 109) and summarised in your columns (*Lancet*, 1940, 1, 1174).

Among 200 cases of leucorrhœa in pregnancy we found 49 cases of vaginal thrush—i.e., almost 25%. The diagnosis was established by staining by Gram's method a film taken from one of the whitish patches which characterise the condition; we found it important that the film should be made from one of these whitish patches, since in several of our earlier cases the diagnosis was missed at first owing to the film being made from the posterior fornix as a routine.

As regards treatment, we found that bi-weekly painting of the whole vagina, external genitalia, thighs and pubic region with 2% aqueous gentian violet is usually successful, and if it does not always cure it never fails to relieve the distressing pruritus from which these unfortunate women suffer. The wearing of a pad for a day after application obviates any staining of the clothing.

Chesterfield. LEWIS G. CRUICKSHANK.

SIR,—Increasing attention is being given to the monilia group of infections. In the last twelve months I have had 27 cases amongst patients attending the discharge clinic of the Middlesex Hospital. The appearance on clinical examination was diagnostic in most of these cases and monilia was found in swabs taken from the neighbourhood of a typical patch of vaginal thrush. Eight of the patients were pregnant. In one case large numbers of monilia were found in a catheter specimen of urine which contained a few pus cells but no other organisms. The routine Negatol treatment as previously described for trichomonas infection was used in the first 16 cases and the results were satisfactory. The remaining cases have been treated by means of Monsol (1 in 200) douches. This latter method was suggested to me by a colleague who obtains excellent results with this substance in the treatment of oral thrush. In the treatment of acute gonorrhœa I have recently been insufflating the upper vagina with powdered sulphanilamide using 3 g. on each of two occasions within the first ten days, this in addition to the routine administration of M. & B. 693 by mouth. I was prompted to try this by

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the reported efficacy of packing wounds with powdered Prontosil, but I have not done it often enough to justify any conclusion.

Middlesex Hospital, W.1. O. LLOYD.

TREATMENT OF WAR NEUROSES

SIR,—Dr. Pegge states that as psychiatrist to a group of four hospitals in the London area he has been asked to see a number of psychiatric casualties (by which he apparently means neuroses) at only one of them, and he wonders why such cases should be absent from the other three. I suggest that they were present in equal numbers, but that they were at once cured by the medical officers who saw them on admission. Dr. Pegge does not seem to realise that others besides psychiatrists can practice the simple forms of psychotherapy required for these acute cases.

Oxford. ARTHUR F. HURST.

NEUROTICS IN THE FORCES

SIR,—Lightheartedly, in his letter to THE LANCET of Sept. 21, Dr. Hendry sets out to tell us what is reasonable and what is not reasonable doctrine concerning the neuroses. He declares that it was the general experience of regimental medical officers in the last war that soldiers who had broken down in the firing line should not be returned to it, and if they were they had to be "very carefully watched, guarded and supported in order to keep going." As a former regimental medical officer and later as "shell-shock" specialist to one of the armies in France in the last war, responsible in both positions for sending shell-shock cases back to the firing line, I have on more than one occasion challenged the accuracy of this statement and asked for the evidence on which it was based. Will Dr. Hendry, as he speaks with such confidence, produce it and settle the point once and for all? The idea of a regimental medical officer carefully watching, guarding and supporting returned cases of "shell-shock" in his unit is not a little entertaining.

London, W.1. FREDERICK DILLON.

SIR,—Your leading article of Sept. 7 urges that prophylaxis of neurosis is likely to reward investigation. Successful physical education is one item in this prophylaxis and must help to create a state of health which will react quickly back to normal should it be assailed by accident or disease. But physical education cannot achieve its aim of contributing to better health if it is divorced from general education. In boys between eight and fourteen much can be achieved by treating nervous instability with skilled physical education either individually or in small groups.

This instability which may be the precurser of adult neurosis manifests itself in many ways—e.g., general muscular imbalance shown in poor postures and bad movements, choreiform movements, general untidiness, tachycardia, asthma. Alternatively, careless habits of posture and movement may predispose to nervous instability. In treating these conditions in boys, one aim is to improve function by training, another to improve coördination by insisting on accuracy in posture and in the detail of all movements. An efficient and accurate physical mechanism capable of reasonable accuracy in sensation and in action should help to create mental confidence. It seems to me to be failure if boys, or for that matter members of H.M. Forces, leave their physical-education classes to relax at once into bad postures and walk away with feet in the valgus position.

Sutton, Surrey. A. L. KERR.

DIPHTHERIA DIAGNOSIS BY POST

SIR,—I feel that the case cited in your annotation (Sept. 21, p. 367) is hardly a fair one. A doctor who posts a swab on a Saturday evening cannot, however efficient the service, expect a reply in reasonable time, and the responsibility for the death therefore rests with him. Every efficient private laboratory has a service to pick up urgent swabs, either from the doctor himself or from the railway station to which it can be sent at once by passenger train, and these swabs are planted immediately. It is often possible to examine direct films at once.

The diagnosis of diphtheria by means of swabs is a highly skilled operation, and an experienced and efficient operator at a small distance is better than a second-rate one on the spot. As far as the use of tellurite media is concerned, the delay resulting from this occurs in any case, and the use of a more rapid diagnostic method in parallel should never be omitted. The emergency public-health laboratories of the Medical Research Council have not solved the problem of speed, for instances are already apparent of work being sent to much greater distances than previously. Public-health authorities have even been canvassed by these laboratories to send their pathological work to a town at a distance when this work was already efficiently carried out in the town itself, which seems to be in violation of the plea made at their inception by the Ministry of Health, that they were intended to supplement existing facilities and not to supplant them.

London. J. W. SHACKLE.

DEATH IN INFANTILE ECZEMA

SIR,—In a recent annotation (*Lancet*, June 29) the occasional sudden death of infants with eczema is left unexplained. I suggest that death in these cases is caused by complete exhaustion of the adrenal glands as a result of an acute infection, following a brief initial stimulation which produces a transitory pyrexia. This could probably be proved by bacteriological examination along modern lines before death, and a complete post-mortem examination immediately after it. In allergic subjects there is underaction of the adrenal-sympathetic system with relative vagotonia. An acute infection causes the allergic symptoms temporarily to disappear, partly, no doubt, owing to stimulation of the adrenals; but subsequent exhaustion of the adrenal-sympathetic system exacerbates the symptoms with a fall of blood-pressure and sometimes increased pigmentation of the skin. Extreme cold has the same effect. One of my patients who suffers from prurigo and asthma relapses whenever the weather is cold; her systolic blood-pressure falls to 80 mm. Hg, and her skin becomes deeply pigmented. Improvement, in her case, always follows injections of adrenal cortical hormone. Cramer[1] showed that if a normal mouse is exposed to moderate cold the adrenal and thyroid glands are stimulated and vigour is increased, but that if it is exposed to extreme cold the glands become exhausted and temperature and blood-pressure fall; if the exposure is prolonged the animal dies. Patients with relative insufficiency of the thyroid-adrenal sympathetic system (many of whom are allergic) are depressed and made relatively inactive by even moderate cold.

Apart from instability of this system, eczematous infants tend to have periods of fluid retention in the tissues; symptoms at these times are active and subside temporarily with diuresis. Allergic patients often show alternation of symptoms: when their asthma is troublesome, for example, their eczema is quiescent and vice versa. They also tend to become sensitised to various exogenous and endogenous allergens. Keeping these facts in mind, I submit my comment on the main features of these fatal cases as described by Twiston Davies[2]:

1. "The accident occurs during the first year of life"—that is, before some stability of the thyroid-adrenal-sympathetic system and immunity to common infections have been established.

2. "Undernourished infants are not so susceptible as large fat infants with or without a tendency to rickets."—Actually it is a question of fluid retention, not over-nourishment. The skin, subcutaneous tissue, and mucous membranes are watery and in some cases the œdema even causes pitting on pressure. The wateriness of the mucous membranes predisposes to infection with catarrhal organisms.

3. "Most of the cases occur in the spring"—that is, when all common infections are most prevalent.

4. "Nearly all, if not all, cases occur in hospital or away from the mother."—A considerable proportion of patients of all ages develop febrile infections from five to ten days after admission to hospital. However unsatisfactory home surroundings may be, active infections among members of the

1. Cramer, W. Fever, Heat Regulation, Climate and the Thyroid-Adrenal Apparatus, London, 1928.
2. Twiston Davies, J. H. *Brit. J. Derm.* 1940, 52, 182.

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household will occur only at relatively long intervals, and the odds in favour of a baby being exposed to such an infection are much greater in hospital than at home.

5. "The accident usually occurs within the first few days of hospitalisation."—Dr. Davies found that 70% of deaths occurred within 10 days and 50% within 4 days of admission—that is, within the incubation period of common infections.

6. "The onset of the complication is sometimes heralded by improvement of the eczema."—This may be due partly to adrenal-thyroid stimulation at the outset, and partly to the alternation of symptoms characteristic of allergy.

In a typical case the initial pyrexia, which may reach 103° F. or more, can only be due either to an infection or to hæmorrhage into the adrenals; such hæmorrhage may occur either in association with acute bacterial infections or in their absence. Allergic children are apt to develop alarmingly high temperatures as a result of infections which would evoke but a slight temperature in normal children. Recovery may be rapid and complete, and Dr. Davies remarks that "the child may even become comatose and yet the following day present its normal aspect and take its food as usual." This abnormal reaction to common infections is, I think, an example of adrenal-sympathetic instability; and it is logical to suppose such an intense response might lead to rapid exhaustion of the adrenals.

Dr. Davies suggests that adrenaline, given promptly, can be of value in treatment; probably the effect would be enhanced by combining it with cortical hormone. Post-mortem examination may reveal no obvious cause of death, but the effects of so recent an infection would hardly be manifest to the naked eye, and changes in the adrenals could not be demonstrated unless they were removed immediately after death and examined by Cramer's method.

London, W.1. H. W. BARBER.

PSYCHIATRIC COMPLICATIONS OF HYPOGLYCÆMIA

SIR,—Surgeon Lieut.-Commander Anderson's paper in THE LANCET of Sept. 14 raises an important question. Does hypoglycæmia produce permanent cerebral lesions in those who survive? If so insulin is indeed a dangerous drug, for most diabetics, both children and adults, have severe hypoglycæmic attacks from time to time. I know of only one case, reported by Campbell,[1] in which there was profound mental derangement after hypoglycæmia. A woman of 47 made a dramatic recovery from status epilepticus (blood-sugar 30 mg. per 100 c.cm.) immediately after the excision of an islet tumour of the pancreas, but remained in a state of mental confusion with dysarthria although the blood-sugar was normal. There was no autopsy and it is possible that a cerebral vascular lesion occurred during the violent and prolonged convulsions.

Both of Anderson's cases were in diabetic boys, who may be supposed to be more liable than adults to cerebral lesions; on the other hand, children often have a very low blood-sugar without symptoms. Both boys were mentally backward before the onset of diabetes. The first, aged 13, showed a great deterioration in mental capacity after being in coma for four days. On the first day of this coma he may have been hypoglycæmic, though the evidence is inconclusive and was not confirmed by blood-sugar estimations. He was certainly not hypoglycæmic on the second and fourth days of the illness since the blood-sugar was over 180 mg. per 100 c.cm. and there were ketone bodies in the cerebrospinal fluid and glycosuria. From the second day he had fever and it seems possible that the whole of the symptoms and sequelæ were due to some such condition as encephalitis. If any hypoglycæmia preceded the mental deterioration it was of comparatively short duration. The other boy, aged 7, showed striking behaviour disorders which were at least partly due to his low mental capacity and bad environment and even his most violent actions occurred when the urine was only "more or less sugar free." In both cases the evidence that hypoglycæmia was present is not convincing; that there were other ætiological factors is certain. Moreover, when one considers the repeated and prolonged insulin coma with very low content of sugar in the blood and cerebrospinal fluid which schizophrenic patients undergo with mental improvement, it hardly seems possible that the dementia of these boys was due to hypoglycæmia.

With regard to the use of zinc protamine insulin in children, its slow action is apt to cause hypoglycæmia in the night or early morning in those who have their last meal at 5 or 6 P.M. Protamine (delay) insulin is often more suited to young children especially if given with a dose of soluble insulin.

Hove. G. M. WAUCHOPE.

1. Campbell, W. R., Graham, R. R. and Robinson, W. L. *Amer. J. med. Sci.* 1939, 198, 445.

ABACTERIAL PYURIA

SIR,—May I add to the list of causes of "sterile" pyuria mentioned in your annotation of Aug. 24 (p. 237) the abacterial pyuria due to urethritis. I had the opportunity of examining a few cases of pus from the urethra, mostly from young men, without any visible micro-organisms. These were cases of what is known as urethritis protozoica. In smears stained with Giemsa there were epithelial bodies, so called inclusions, such as are sometimes found in the conjunctival pus. The cases were subacute or chronic and resisted local treatment. They respond best to local treatment with copper sulphate (1–10% aqueous solution), and to arsenic compounds, either pentavalent (Stovarsol sodique or Spirocid) by mouth or Neosalvarsan intravenously.

Glaxo Laboratories Ltd. J. UNGAR.

INTRAMUSCULAR INJECTIONS OF VITAMINS A AND D

SIR,—Preparations of cod-liver oil have been in use for some time in the treatment of infected wounds and abscess cavities, and good results are claimed in accelerating healing and encouraging healthy granulation. It occurred to me that intramuscular injections of a fish oil rich in vitamins A and D might prove of benefit in various localised infections, and Messrs. Parke, Davis and Co. prepared me a sterilised solution of Nadola (a concentrated fish-liver oil) in olive oil which I have found valuable in staphylococcal and similar infections during the past year.

The following types of case have responded to the treatment: threatened breast abscess, perineal abscess, septic hand, infected insect bite, carbuncle, tonsillitis, threatening quinsy, developed quinsy, pre-auricular abscess, sequestrum of jaw and erysipelas of the face in an early stage. Boils and some cases of pustular eczema have also responded well.

The injections are painless, especially if the solution is warmed; occasionally there is a little local irritation around the site of injection. In feverish cases there is often a striking fall of temperature. Threatened abscesses will usually abort, but where tissue breaks down pus is localised and easily evacuated and the cavity heals rapidly. Pain is relieved early and there are prompt localisation and reduction of inflammation. In feverish cases injections are given daily for 3 or 4 days. In non-feverish cases doses on alternate days may suffice. The dose used has been 2 c.cm. made up of 0·5 c.cm. nadola in 1·5 c.cm. of olive oil. The back of the upper arm in the lower third or the buttock is a convenient site for injection, and it may be given with a large hypodermic needle.

Southampton. H. STANLEY-JONES.

SECONAL

SIR,—I was asked about eighteen months ago by Messrs. Eli Lilly to try the effects of Seconal as premedication in general surgery. I have tried it out with the help of the staff of the Wellhouse Hospital and we have found it satisfactory and reliable—by far the most reliable barbiturate of which we have had experience. The great majority of the patients come to the theatre really sound asleep. This in itself is a valuable property of the drug, but a ward sister drew our attention to the fact that it also reduced postanæsthetic vomiting. This particular sister kept records of 100 consecutive operations and found that only 8 patients vomited after operation. The ward was a women's ward, and possibly women are less likely to vomit than men. Considering all types of patients and operations on both men and women, we find that no vomiting occurs at all in 75%

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of cases following seconal. When it does occur it is slight, and we never see those distressing cases of vomiting lasting sometimes two or three days after operation. We have used ether or vinesthene ether freely, so the absence of vomiting cannot be attributed to the type of anæsthetic used. We have not noticed any marked reduction in postanæsthetic vomiting after using other sedative drugs for premedication.

Wellhouse Hospital, Barnet. JOHN ELAM.

E.M.S. SALARIES

SIR,—The eighth report of the Select Committee on National Expenditure, recently published, reviews the position of the Emergency Medical Service during its first year of activity and makes recommendations and comments which, in view of the prolonged correspondence in your columns upon this subject, may interest your readers. In a letter to the *Times* of Sept. 14, 1939, I pleaded for the retention of the voluntary principle in staffing the E.M.S. in place of the scheme of practically compulsory enrolment established by the Minister before the outbreak of war. The select committee expresses its regret that this service was not recruited on a voluntary basis from the beginning. Responsibility for the scheme adopted by the Ministry of Health is squarely placed on the Central Emergency Committee of the B.M.A. and a subcommittee. The select committee comments upon the anomaly (*Lancet*, 1940, 1, 574) by which the English members of the consultant advisory committee of the Ministry should have received remuneration not accepted by their Scottish colleagues. The select committee finds that this differentiation has no justification and recommends the withdrawal of that remuneration. It further recommends the abolition of part-time service of the consultant members of the E.M.S. by which a retaining fee of £500 a year is allowed, and suggests replacing this system by payment on a sessional basis.

The select committee was set up to constitute a check on extravagance in national expenditure and it points out that the cost per bed per annum of the salaried medical staff resulting from the measures taken for the provision of emergency service has reached in London £11, whereas the cost in England and Wales was rather more than £4 and in Scotland rather less than £1. The committee has a representative all-party constitution; its influence has already proved so great that it is probable that these recommendations will become operative at an early date.

Wimpole Street, W.1. E. GRAHAM-LITTLE.

THE NURSE ANÆSTHETIST

SIR,—Your leading article of Sept. 7 must have read as a challenge to many British anæsthetists. It will be admitted that a contingency might arise where urgent surgical work demanded attention and no medical anæsthetist was immediately available. Such an emergency, however, cannot form an honest pretext for discarding the principle in medical administration and legislation in this country that anæsthetics be given by medical men and women. For THE LANCET to suggest that in the circumstances described the choice lay between an unqualified anæsthetist and no anæsthetist at all is a quite unwarranted conclusion. Dr. Parsons's reply to the Association of Anæsthetists, far from mitigating, has aggravated the offence in the minds of British anæsthetists. Whereas one wondered whether the honorary medical and surgical staffs of Addenbrooke's Hospital had been consulted in the matter it now transpires that the honorary staff are the instigators of the policy and Dr. Parsons seeks to justify them.

It cannot surely be that the staff of the medical school of the University of Cambridge have no constructive ideas about anæsthetics. Addenbrooke's Hospital, in common with medical institutions all over the country, has been seriously depleted of its personnel in anæsthetics. Women medical resident anæsthetists are to be had and in my experience they are very efficient. They will not be called to military service and they can be retained if the authorities care to reward them in proportion to their experience and their service. Why does not the anæsthetic staff of Addenbrooke's Hospital train some of their women medical and surgical officers and promote them to be resident anæsthetists?

Anyone who has seen the nurse-anæsthetist system in the teaching hospitals of the United States of America will realise that the governing bodies of these institutions have been caught in a vicious circle. The supply of anæsthetists in America has been, and still is, very far from equal to the demand for them, so that the medical anæsthetist in the United States is very fully occupied and frankly admits that he has no time to devote to ordinary hospital cases or to the teaching of undergraduates. Nor will the amour propre of the undergraduate or the interne permit him to go to the nurse-anæsthetist for tuition or for practice in administration. Hence the continued scarcity of medical anæsthetists in the U.S.A.

He is a bold man and very short-sighted who will risk the vicious circle and support the policy that even the thin end of the wedge of the system of nurse-anæsthetist should be introduced into the teaching hospitals of this country.

Dept. of Anæsthetics, Aberdeen. J. ROSS MACKENZIE.

SIR,—What is meant by "a good anæsthetic"? Patients, surgeons and anæsthetists would all, I fancy, give a different answer to the question. Broadly speaking, the patient means a pleasant induction and no unpleasant after-effects; the surgeon means a degree of muscular relaxation sufficient for him to work unhindered; the anæsthetist means a clear airway, a satisfactory colour, pulse and respiration throughout the operation, and no crises on the table or afterwards. Doubtless the modern anæsthetic machine in skilled hands gives, as a rule, the best results. But what about the modern machine in unskilled hands? A certain surgeon whose lot it is to operate on patients anæsthetised (more or less) by young residents learning to use modern machines sighs wistfully for the good old days of the rag and bottle. He tells me that, in his hospital practice, what he calls a good anæsthetic is the exception nowadays rather than the rule. The fact is that many are called to give anæsthetics but few ought to be chosen. It seems that in this small specialty a certain temperament is necessary if success is to be achieved. But there is no reason to suppose that this temperament is found only among those holding a medical degree or diploma. Nurse-anæsthetists gave a good account of themselves in the last war. Is it to be assumed that there are no longer any nurses temperamentally suitable as anæsthetists provided, of course, that they are adequately trained?

Crediton. L. N. JACKSON.

ASCORBIC ACID AS AN INDEX OF NUTRITION

SIR,—I am not in a position to comment on Dr. Todd's suggestion that scurvy may not be due to lack of ascorbic acid; but, in his reference to the undoubted fact that fresh meat can cure scurvy, he infers that the amount of ascorbic acid present is insufficient to account for the cure. This may be so, but he may not be taking into account the quantity consumed. The Eskimo, and the white man who lives as Stefansson did, use very large amounts of fresh meat or fish, usually lightly cooked or frozen, and in such quantities sufficient vitamin may well be present.

Inverness. RUSSELL D. MARTIN, formerly M.H.O. Coppermine, N.W.T. Canada.

THE COMMON POPPY

SIR,—Among the many plants mentioned in your columns as suitable for cultivation in England for their therapeutical value I have seen no reference to the corn or field poppy (*Papaver rhœas*). This wild red poppy of the east coast, in a climate that is rarely more than moderately warm, produces a juice which when dried gives the effect of opium in similar doses. I am informed that in the southern counties the natives used to chew poppy heads for pain. From Woodville's "Medical Botany" (1793) I learn that a syrup of the flowers was then in use as an anodyne and pectoral but that "it was valued rather more for the beauty of its colour than for its virtues as a medicine." This is now used as a colouring agent only (syrupus rhœados, B.P.C.). Bruce and Dilling say of opium "there are English varieties." I have not been able to meet with any. My experiments with inspissated poppy juice have been only on myself but they suggest that the English poppy might be worth cultivating.

Saxmundham. K. HEANLEY.

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Public Health

From the School Reports

THE report on the medical inspection and treatment of the children of *Kent* for 1939, written by Dr. J. W. Fox, deputy school medical officer, and presented by Dr. Constant Ponder, M.O.H. and S.M.O. of the county, has some historical importance; for during the early months of the war Kent included evacuation, reception and neutral areas so that children were shifted from one part to another of the same county. In 1940 Kent became the centre of the Battle of Britain and its child population had to be dispersed widely; the report for this year will therefore deal with what has been done with the children rather than with what has been done for them. After the war when the Kentish children return to their homes we shall be able to study what permanent influence their enforced migrations have had on them. Fortunately the health of Kentish children in the peace years has been very fully recorded. The geographical county of Kent is made up of the metropolitan area, the seaside resorts, and the land occupied by the men of Kent. The education authority is not responsible for the majority of the two former, most of the divisions of which are their own education authorities, so it happens that the county deals mainly with the truly Kentish people. At the end of the first three months of the war the normal school population of 82,949 was increased by 16,800 transferred from the evacuated areas, mainly outside the jurisdiction of the county council, but beyond closure of the schools for a fortnight there was little interference with the routine of school medicine or difficulty in extending it to the received children. Evacuation brought out in Kent, as it did in other receiving areas, that the basic school service is highly elastic, whereas the subsidiary services, chiefly nutritional aid and dentistry, have no such power of expansion. The original service was planned on a fairly generous scale for a larger child population than exists at present, whereas in few districts had dentistry developed to cover the basic needs of the resident population, and the provision of nourishment was made grudgingly as something alien to the educational system. Dr. Fox says that war-time conditions necessitate increasing the attention to nutrition and it is hoped that this may be a prelude to regular nutrition centres. Since the beginning of the century the Board of Education has recognised that children cannot benefit from education unless they are well fed and well doctored, but that the feeding and doctoring are integral parts of education is a new conception and the first definite leader for reconstruction which has emerged from the present war.

From Dr. Ian McCracken's school report for *Durham County* it is apparent that the outbreak of war caused greater dislocation of the school medical service there than it did in most parts of the country. This was to be expected, for owing to the economic state of the county in peace-time the social services have had to confront great difficulties. A table of the cases examined at the school clinics during 1939 brings out the hard case of Durham children compared with such counties as Kent which were generally prosperous. Though out of 11,385 cases treated only 65 are labelled as malnutrition, 636 were suffering from debility, 270 anæmia, 339 bronchitis, 173 rheumatic conditions, 104 chorea and 81 disorders of digestion. In districts where the level of nutrition is high the cases treated by the school department are not only few but generally capable of accurate diagnosis, whereas where nutrition is poor there are large numbers of departures from health which do not admit of definite clinical differentiation.

Small education authorities suffered in many instances by the calling up of the whole personnel. Thus Dr. G. W. Fleming reports that in *Gosport* dental treatment had to be suspended because the only school dentist had to go on service. The Board of Education should see that this does not happen and help authorities which get into unavoidable difficulties. School dentistry and medicine are the rights of every child attending a state-aided school, and the central authorities should see that he gets them.

In the first phase of the war *Scarborough* was a reception area. Dr. Fox Linton reports that in September, 1939, he had to receive 5388 evacuees which subjected the school medical service to great strain. This is understandable, for the average attendance at the elementary schools in peace-time is only about 4000. The children came from Hull, Middlesbrough and West Hartlepool and naturally were not up to the standard of cleanliness to which Scarborough is accustomed. For the first fortnight the school clinic was turned into a cleansing station and an emergency cleansing station was opened on Sept. 3. Many children required re-clothing. Scarborough, being a holiday resort, should have plenty of room for the reception of large numbers of refugees, but the billeting of verminous or objectionable persons is a matter of great difficulty, the full extent of which was not recognised before evacuation took place. Scarborough has a special class for the treatment of speech defects. In 1939 the number of children admitted to the class was 57, of which 48 were boys. Half of them were cured. Lispers and lallers can usually be cured fairly easily but stammerers require long treatment which must be started early to be successful.

Obituary

PETER BERNARD SPILSBURY

B.M. OXFD.

Gillman, Oxford.

On Sept. 16 Peter Spilsbury was killed by enemy action while on duty at St. Thomas's Hospital. He was the second son of Sir Bernard Spilsbury and was 25 years of age. Educated at Rugby and Magdalen College, Oxford, he obtained a second class in the final honours school of physiology in 1937. He entered St. Thomas's Hospital medical school and took his B.M. last July. He had just begun his duties as house-surgeon to Mr. W. H. C. Romanis but had not then decided whether he was going to be physician or surgeon.

INFECTIOUS DISEASE IN ENGLAND AND WALES

DURING THE WEEK ENDED SEPT. 7, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1449; whooping-cough, 1055; diphtheria, 929; enteric fever, 126; measles (excluding rubella), 5949; pneumonia (primary or influenzal), 371; puerperal pyrexia, 150; cerebrospinal fever, 107; poliomyelitis, 42; polio-encephalitis, 4; encephalitis lethargica, 2; dysentery, 57; ophthalmia neonatorum, 93. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 6 was 959, made up of: scarlet fever, 174; diphtheria, 191; measles, 201; whooping-cough, 27; enteritis, 25; chicken-pox, 31; erysipelas, 24; mumps, 6; poliomyelitis, 1; dysentery, 8; cerebrospinal fever, 30; puerperal sepsis, 26; enteric fevers, 40; german measles, 2; other diseases (non-infectious), 88; not yet diagnosed, 85.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from scarlet fever, 1 (0) from enteric fever, 2 (0) from whooping-cough, 8 (0) from measles, 36 (0) from diphtheria, 46 (7) from diarrhœa and enteritis under 2 years, and 11 (0) from influenza. The figures in parentheses are those for London itself.

The fatal case of enteric fever was at Rotherham. Liverpool reported 6 deaths from diphtheria, Nottingham and Plymouth each 3.

The number of stillbirths notified during the week was 207 (corresponding to a rate of 38 per thousand total births), including 20 in London.

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Notes, Comments and Abstracts

MODIFIED BRAUN'S SPLINT

By F. P. FITZGERALD, M.B. Dubl., F.R.C.S.I.

FRACTURE AND ORTHOPÆDIC REGISTRAR AT THE ROYAL NORTHERN HOSPITAL, LONDON ORTHOPÆDIC SURGEON TO THE WELLHOUSE HOSPITAL, BARNET (E.M.S.)

BRAUN'S splint for fractured femur has been altered in almost every way since Böhler reintroduced it with his own modification. Many of the alterations are cumbersome and costly. Those described here are simple and inexpensive.

FRACTURES JUST BELOW THE LESSER TROCHANTER

The upper fragment is strongly flexed. The ordinary Braun's splint is not satisfactory even when the patient is propped up on a high bed rest. By hinging the splint so that the angles can be varied it is possible to make the oblique bars vertical (fig. 1). Then, with the usual skeletal traction through the crest of the tibia and with a pulley from the overhead beam of a Morrison's frame (or any balkan beam), the lower fragment may be brought into line with the upper.

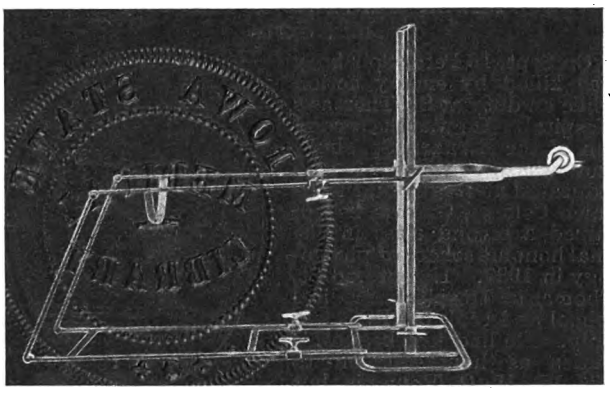

FIG. 1—Hinges are fitted at the angles. The long bars slide along each other and are clamped by wing nuts. The pulley-piece slides up or down on the uprights. The semicircular cross-piece near the top upper hinge is to prevent straining the hinge when bandaging.

Apart from fractures, the splint has been used to overcome spasm and to correct flexion in a tuberculous hip. The angles are first arranged to suit the flexion and then gradually altered until the required inclination is achieved (fig. 2). The splint can be taken to pieces and packed into a small space (fig. 3).

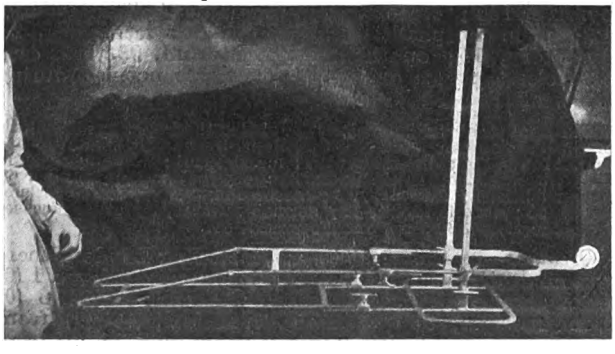

FIG. 2—The transverse bars have been lowered, and the angles have altered accordingly.

FRACTURES OF THE SHAFT

Normally the femur is bowed forwards. When it is broken this curve is lost. The usual method of treatment by traction on a Braun's splint will bring the fragments into a straight line but will not reconstitute the arc. This difficulty has been overcome by fitting two bowed pieces of metal to the oblique bars of the splint (fig. 4). The bandage used to pad the splint is wound tightly round them and then round the upper horizontal bars.

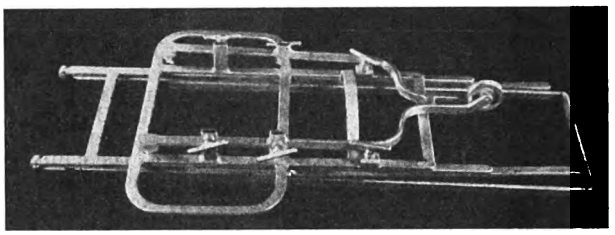

FIG. 3—Assembled for storage or transport.

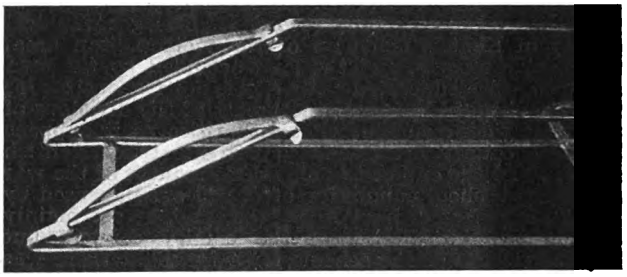

FIG. 4—The bows in place.

These expedients have not been tried out exhaustively, but the results in the few cases treated have been encouraging. Both appliances were made for me by the Medical Supply Association. The cost of the splint is 35*s*. The bows cost 9*s*. a pair.

TESTS OF CIRCULATORY EFFICIENCY

IN these days of scientific medicine, when clinical impressions are being gradually ousted by objective measurements and the functional efficiency of any organ must be gauged by some precise yardstick, the cardiovascular system should be capable of accurate assessment. Of the many tests recommended—exercise tolerance, venous pressure, circulation time, cardiac output, vital capacity—not one, used singly, yields any more information than a careful examination of the patient and a full and accurate case-history. Measurements of circulation time and cardiac output are too complicated for routine clinical use, and the exercise-tolerance test seldom gives additional information of value. The response to undressing, for instance, usually provides as much, if not more, information about the functional capacity of the heart than climbing steps or touching toes; and neither of these procedures is as accurate a guide as the patient's statement that he can manage on the level so long as he does not hurry, but the moment he tries to hurry or starts to climb stairs he becomes short of breath or develops pain in the chest. Again, attempts to simplify laboratory procedures so that they can be carried out by the clinician without any apparatus or technical knowledge are seldom helpful. The most successful of these—the use of the veins in the neck as a guide to the venous pressure—cannot be given the significance which some ascribe to it. As one of several pieces of information it is of value, but by itself it gives little help. These various procedures may add to our knowledge and throw light on the mechanism of the cardiovascular system in health and disease; but we must realise that the cardiovascular system is a complicated piece of mechanism whose functions are closely interwoven with the other systems of the body. In other words, the simpler the test the less likely is it to provide reliable information. There is a point beyond which the process of simplification cannot be carried, and we must try to obtain as much help as possible from the patient's history and reactions to ordinary clinical methods. This is a safeguard against applying the results of the laboratory to clinical practice in an entirely uncritical spirit.

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QUARTERLY JOURNAL OF MEDICINE

THE July issue contains the following papers, together with a report of the proceedings of the thirty-fourth annual general meeting of the Association of Physicians:

POISONING BY METHYL MERCURY COMPOUNDS. By Donald Hunter, Richard R. Bomford, and Dorothy S. Russell (London Hospital). The authors report four cases of poisoning, resulting from the inhalation of methyl mercury iodide or nitrate by workmen engaged in manufacturing the latter compound as a fungicidal dressing for seed (wheat and barley). The poison affected the nervous system only, producing severe ataxia, dysarthria, and constriction of visual fields, with sometimes extensor plantar responses. There was little sign of recovery in one to three years, though re-education could reduce the disability. In animal experiments methyl mercury compounds selectively damaged peripheral nerves, posterior spinal roots, the posterior columns, and the granular layer of the middle lobe of the cerebellum.

LIVER FUNCTION IN THYROTOXICOSIS. By N. F. Maclagan and F. F. Rundle (Westminster Hospital). Blood galactose estimations, made at half-hour intervals for two hours after administration of 40 grammes of galactose by mouth, yielded evidence of diminished galactose tolerance—i.e., impaired liver function—in at least 30 out of 41 thyrotoxic patients. The results of the test can be roughly correlated with B.M.R. and the clinical severity of the disease. Galactose tolerance improves slightly with iodine treatment, but greatly (though not always to normal) after partial thyroidectomy. In rabbit experiments thyroxin injection impaired the animals' tolerance to intravenously injected galactose, and the livers showed focal necroses. The test in man promises to be of value in the management of patients.

THE ACTION OF PARASYMPATHETIC-MIMETIC DRUGS IN ASTHMA. By H. H. Moll (Leeds). Acetyl-β-methylcholine injected subcutaneously in 10 mg. doses, induced asthma-like attacks in nearly all of 28 asthmatic subjects, irrespective of the dependence of their asthma on infective, allergic, psychological or other factors. Atropine and adrenalin cut short the induced attacks equally well, and 500 mg. ascorbic acid given intravenously abolished them a little more slowly. Control subjects showed general signs of parasympathetic stimulation but developed no chest symptoms. The author argues that the asthmatic's abnormal sensitivity lies in his bronchial system rather than in his vagal centre, and that lung damage is an essential factor in determining it.

A SUSPECTED CASE OF LEPROSY

IN the 15th century records of the King's closed correspondence (as distinct from letters which were sent open) were kept in what are called close rolls. Mr. Kenneth Ledward, an assistant keeper of the Public Record Office, has sent us from the roll of the eighth year of the reign of King Edward IV an extract from a commission of doctors called upon to testify on a suspected case of leprosy. Joan de Nightyngale of Brentwood in Essex was thought by her neighbours to be a leper, and on July 10, 1468, the King issued a writ directing the sheriff of Essex "to take with him discreet men of the county who have the best knowledge of that disease and of her person to repair to her and cause her to be examined in their presence, and if he shall find her a leper to remove her to a solitary place, there to dwell as the manner is, as the King has learned that she is leprous, and has her conversation among men of that county in public and private places, refusing to move to a solitary place, and his will is to guard against such peril, and do what is lawful and accustomed." Joan seems however to have got wind of the writ and before it could be executed "came into chancery for remedy and relief." The chancellor decreed that William Hatteclyff, Roger Marchall and Dominicus de Serego should be consulted to "certify in chancery what they should perceive by the science of medicine." Hatteclyff, who was a man of some standing at that time, combined the offices of physician and secretary to the king. The doctors' report to the King on Joan was as follows:

"First they did consider her person, treating and handling her; and making their discourse of all the symptoms of the disease whether it were found in her or no, and after view and consideration of all things needful for true knowledge of what was in doubt, they found that she was not leprous, and needed not to be kept apart: that they are taught by medical science that the symptoms of leprosy are many: that there are four forms, namely alopecia, tiria (satyriasis), leonisia and elefancia, and each may be distinguished by the symptoms: that in this case by discourse of five and twenty best known symptoms and more, they found the woman could not be proved leprous, thereby, or by a sufficient number of them; and that this was sufficient to free her, for none could suffer from the disease without great part thereof being found: and that passing in review forty and more distinguishing symptoms, they found her not marked by either of the four forms aforesaid."

We are not told whether such profound wisdom enabled Joan to keep her freedom.

LEBANON HOSPITAL FOR MENTAL DISEASES

THE annual report of the mental hospital at Asfuriyeh, near Beirut, reaches us at a moment when events in Syria are nearing a crisis. The effects of the war were quickly felt. The influx of private patients from Egypt, Palestine and other neighbouring lands ceased and their place was taken by military and Government cases. Even with the new house for 60 chronic male cases opened last September, increasing the total beds to 500, some cases had to be transferred in order to free 150 beds for possible civilian casualties by arrangement with the French Red Cross Society. In the last war this international hospital, then consisting of 100 beds, stood in Islam, and its medical director, the late Dr. Henry Watson Smith, was virtually a prisoner. But while war and famine prevailed outside, the Turks respected the hospital as *Wakf*. Later it gave invaluable service to General Allenby's troops during an influenza epidemic. Now with its 500 beds the hospital may be called on for yet larger service. Dr. Stewart Miller, the present medical director, has been head of the mental hospital at Khanka, near Cairo, with its 1700 beds, the matron has had 25 years' experience and all the sisters have had general as well as mental training. The London office of the hospital is at Drayton House, Gordon Street, W.C.1.

From a considerable experience of various forms of shock therapy during the last year Dr. Miller has reached the following tentative conclusions. In schizophrenic reaction states that are in any way chronic none of them procures complete recovery or lasting mental benefit. Insulin therapy benefits the patient physically. In acute schizophrenic states non-specific fever therapy yields results as satisfactory as any other, and at less risk and expense. In manic-depressive states non-specific fever therapy will effectively shorten the duration of the attack with less risk to the patient and at less cost than with other forms of treatment.

DOMICILIARY MIDWIFERY SERVICE IN LONDON

AT present the London County Council is paying voluntary hospitals £2 6*s*. 10*d*. for each confinement attended by a midwife acting alone or when a medical student is present, and £1 17*s*. 6*d*. for each confinement attended by a midwife accompanied by a pupil midwife. District nursing associations receive £2 14*s*. for each confinement attended by a midwife. At its last meeting the L.C.C. increased the first and third of these payments to £3 5*s*. and £3 12*s*. 6*d*. respectively; the payment for a midwife accompanied by a pupil is also to be £3 5*s*. unless the Ministry of Health renews its grants for the training of pupil midwives. Sterile midwifery outfits costing 7*s*. 3*d*. are provided free of charge to nursing associations; voluntary hospitals provide their own. Midwives employed by council or voluntary organisation are to receive £2 10*s*. instead of £2 for a first confinement, £2 instead of £1 10*s*. for subsequent confinements or maternity nursing.

GLAXO LABORATORIES Ltd. inform us that the growing demand for Adexolin (concentrate of vitamins A and D) and Fersolate (ferrous sulphate G.L.) has made it possible to reduce the prices of these preparations.

CORRIGENDA.—The director of medical services in Southern Rhodesia, mentioned on p. 402 of our last issue, is Dr. Andrew Paton Martin.

The reference to Miller and Simpson in the paper by Dr. Bentley and Dr. Smithwick in our issue of Sept. 28 (p. 391) should read: Miller, F. R., and Simpson, H. M. (1924) *Trans. roy. Soc. Can.* Ser. III, 18, *Sect.* V, 147.

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GET YOUR STAMPS FROM BART'S

THE war interrupted the Lord Mayor's appeal for the Bart's rebuilding fund but the need remains, and the appeals department of the hospital go quietly on with a job which will still be important when the immediate expenses of the nation are a memory. They are anxious to sell large numbers of stamps which, unlike the post-office variety, have gone down in price. As the editor of the *St. Bartholomew's Hospital Journal* points out, they are nice and sticky and can be used to seal up envelopes which have been once or twice through the post—a pleasant paper-saving sport. The designs on most of the stamps are commendably austere. If they are quickly sold is it possible that the hospital might consider a fresh edition, derived from the pages of "Candid Camera"? But we must buy up these first; a sheet of twelve costs 2*d.*, and can be obtained from the Appeals Department of the hospital.

BY WOMEN FOR WOMEN

THOUGH the "purdah" habit is breaking down in many districts in India, yet women patients are seeking treatment in increasing numbers at Dufferin hospitals which are staffed by women, and the twenty-sixth report of the Women's Medical Service for India,[1] which developed from the Countess of Dufferin's Fund to meet the medical needs of Indian women observing seclusion, reports that the medical cadre of 47 officers maintained their reputation for efficiency during 1939 in spite of many difficulties. At The Lady Hardinge Medical College and Hospital in Delhi 137 women students are being trained, and the reports of the different professors indicate the variety of clinical material available for teaching. The many-sided activities of these students now include hockey, tennis and swimming. Some of the provincial Dufferin hospitals are said to be short of money, because many patients able to contribute towards the cost of their treatment continue to make use of facilities which should be reserved for the poor. The need for encouraging Indian girls of good family to train as hospital nurses is emphasised, but the living conditions provided for them by local hospital committees must be improved. An interesting innovation during the year was a short course for junior service officers in hospital administration.

Medical News

Hospitals Day, Oct. 8, 1940

Next Tuesday the hospitals of London are holding their combined street collection. Last year the amount collected was double that collected in any previous year, and three quarters of the October collection was transferred to the Red Cross. This year when needs are so great it is hard to imagine any need greater than that of the hospitals in London, which, as Mr. MacDonald put it on Tuesday, are coolly carrying on in the front line.

National Institute for the Blind

Lord Nuffield's gift of £10,000 has made it possible for the institute, in conjunction with local societies for the blind and the responsible local authorities, to assist blind civilians. Particulars of any men, women or children whose sight has been injured during air-raids should be sent to the chairman of the institute at 224, Great Portland Street, London, W.1.

M.O.H. for Swindon

Dr. Dunstan Brewer who has held this post for 20 years retired at the end of last month, and on the 16th his colleagues met to do him honour and give him a silver rose bowl. In making the presentation Dr. R. P. Beatty, senior practitioner of the district, said he hoped Dr. Brewer would enjoy many years of active retirement, for he was not the type of man to sit still and do nothing. The local education committee also met to record their appreciation of Dr. Brewer's services to the children of the borough.

The Charterhouse Rheumatism Clinic is continuing treatment of patients including the X-ray department and laboratories.

1. Fifty-fifth annual report of the National Association for supplying medical aid by women to the women of India (Countess of Dufferin's Fund, including the Women's Medical Service), for the year 1939. Simla: Government of India Press.

Honours in the Services

The O.B.E. has been awarded to Major Ralph Brooke, F.R.C.S., R.A.M.C., T.A., for gallant and distinguished services in action in connexion with operations in Norway. The military cross has been awarded to Lieut. A. E. Cooper, M.R.C.S., R.A.M.C., and Lieut. H. A. Dougan, M.B. Dubl., R.A.M.C., for gallant and distinguished services in the field.

Casualties

The following casualties are announced:—

Missing, presumed killed.—Temp. Surgeon Lieutenant H. A. Wallace, M.B. Camb., R.N.V.R., and Prob. Temp. Surgeon Lieutenant E. I. Smith, M.B. Glasg., R.N.V.R.

Wounded.—W.S. Captain F. Murray, R.A.M.C.

Chadwick Lectures

It has been decided to postpone these lectures which were to have been delivered this autumn. Due notice will be given when they are to be resumed.

Royal Society of Medicine

On Tuesday, Oct. 8, at 4.30 P.M., Group Captain C. P. Symonds will deliver his presidential address to the section of psychiatry of this society. He will speak on the neurological approach to mental disorder.

Biochemical Society

A meeting of this society will be held at the department of biochemistry of the University of Oxford today (Saturday) at 2·15 P.M.

The outpatient department of St. John's Hospital for Diseases of the Skin at 5, Lisle Street, Leicester Square, London, W.C.2, announces certain changes in arrangements. Clinics are being held daily from Monday to Friday, from 1 to 3 P.M. The evening clinics and inpatient departments are closed until further notice.

Arrangements have been made with St. Bartholomew's Hospital for the reception of "emergencies" who should not now be sent to the City of London Maternity Hospital.

Appointments

BURNET, W. S., M.D. Glasg., D.P.H.: chief asst. M.O.H for Stirling.
BUTLER, DORA M., M.B. Lond., D.P.H.: temp. asst. M.O. (maternity and child welfare) for Northampton.
COLLINS, ANNIE, M.B. Belf.: temp. asst. M.O. for Heston and Isleworth.
FRANKLIN, J. L., M.D. Camb., M.R.C.P.: physician for diseases of the skin to the Westminster Hospital.
RAFTERY, LILIAN, M.R.C.S.: surgical registrar at the Elizabeth Garrett Anderson Hospital, London.

Births, Marriages and Deaths

BIRTHS

EVERETT.—On Sept. 28, at Sutton, the wife of Mr. A. D. Everett, F.R.C.S., of Leatherhead—a daughter.
FENTON.—On Sept. 19, at Datchet, the wife of Major C. E. Fenton, R.A.M.C., of Barking, Essex—a son.
MEREWETHER.—On Sept. 26, in London, the wife of Major Henry Osborne MacCabe Merewether, R.A.M.C., of Folkestone—a daughter.
PUGH.—On Sept. 17, in Oxford, the wife of Lieutenant Griffith Pugh, R.A.M.C.—a son.
STANLEY.—On Sept. 24, at East Grinstead, the wife of Dr. Roger Stanley—a son.
WHITELAW.—On Sept. 19, at Hertford, the wife of Dr. Alan Whitelaw—a daughter.
WHITTERIDGE.—On Sept. 24, in Oxford, the wife of Dr. David Whitteridge—a daughter.

MARRIAGES

HILEY—SHORT.—On Aug. 23, at Halifax, Nova Scotia, Charles Arthur St. Clair Hiley, Surgeon Lieutenant, R.N.V.R., to Ena Short.
WARBURTON—LEE.—On Sept. 24, at Newtonmore, Inverness-shire, John Rollo Noel Warburton, Lieut.-Colonel, R.A.M.C., to Mary Hartwell Lee.
WITT—ALLOTT.—On Sept. 28, at Harrogate, Robert Witt, M.R.C.S., to Margaret Allott.

DEATHS

HOYLAND.—On Sept. 26, at Ipswich, Stanley Stenton Hoyland V.D., M.D. Durh., late Colonel A.M.S., T.R., aged 84.
SPILSBURY.—On Sept. 16, at St. Thomas's Hospital, Peter Bernard Spilsbury, B.M. Oxfd, aged 25.
THOMSON.—On Sept. 25, Frederick George Thomson, M.A. Camb., M.D. Lond., F.R.C.P., of Bath.
ZEAL.—On Sept. 17, as a result of enemy action at sea, Betty Margaret Zeal, M.B. Lond., D.P.M., aged 30.

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ORIGINAL ARTICLES

EXPERIENCE AT A CASUALTY CLEARING STATION

BY

J. J. MASON BROWN
F.R.C.S.
MAJOR R.A.M.C.

JAMES A. ROSS
M.B. Edin., F.R.C.S.
CAPTAIN R.A.M.C.; SURGICAL SPECIALIST;
AND
DOUGLAS DIVINE, M.B. Camb.
MAJOR R.A.M.C.; ANÆSTHETIC SPECIALIST

WALLACE M. DENNISON
M.B. Glasg., F.R.C.S.
MAJOR R.A.M.C.; SURGICAL SPECIALISTS

A SMALL military hospital in this country was unexpectedly presented with the problem of dealing with 500 of the more seriously wounded evacuated from Flanders. In addition to these many "walking wounded" passed through our hands. The casualties arrived in every conceivable condition and after various intervals from the time of their injury. Airmen were admitted within an hour or two of injury, but most of the wounds had been sustained at least 24 hours before arriving in England. Many of the patients had been immersed in the sea for long periods. Some men, wounded in the first onslaught across the Belgian frontier, were not received for four or five days. Not a few had been wounded on two or even three different occasions during their retreat and embarkation under fire. Most wounds were still protected by an unchanged "first field dressing."

Coated with grime and sand, unshaven, exhausted by lack of food and sleep, shaken by many hours of continual bombardment, and with fearful wounds, it was amazing to us how they had survived at all.

All the patients were treated immediately on admission for severe secondary shock. Intravenous saline was needed less often than we expected, since almost every patient welcomed, swallowed and retained large quantities of hot sweet tea. The value of adequate resuscitation treatment with morphine, shock cradles and fluids, for many hours if necessary, cannot be overstressed. Incidentally large numbers of shock cradles were improvised at short notice by the garrison engineer. Blood-transfusions were given in all cases where blood loss was a feature of the injury, their supreme life-saving importance being amply demonstrated. Fortunately we had established our own blood bank under the control of Major W. G. P. Mair, R.A.M.C., before this emergency arose.

OPERATIVE PROCEDURE

After resuscitative treatment the question of operation arose. Sorting out a convoy of casualties and deciding on the order in which they should proceed to the theatre seemed to be our most difficult and most valuable task. Irrespective of the specific region involved, early operation was essential in many cases to arrest the shock arising from absorption from large traumatised areas. In others it was necessary to control hæmorrhage more permanently than had been possible during the evacuation. A variety of tourniquets were encountered, from the orthodox anchor pattern down to helmet straps, puttees and string. Information regarding time of application was scanty. The tourniquet had undoubtedly saved many lives, but the limb below the compression level in several instances was dead, and in others the tissues were so devitalised that gangrene and severe sepsis had already developed.

The well-known signs and symptoms of gas gangrene placed many cases on our "immediate theatre" list. The two varieties of gas gangrene as described by Frankau (1939a) were encountered. In group 1 (massive gangrene) amputation was performed where possible; in group 2 (group gangrene) affected muscles were widely excised. The wounds were irrigated with hydrogen peroxide and dressed with sulphapyridine in powder form (Ogilvie 1940b). Anti-gas-gangrene serum was administered, and was combined with sulphapyridine by mouth. Four tablets of M. & B. 693 were given as an initial dose, followed by two tablets four-hourly.

Apart from pressing emergencies operation was most often performed for cleansing the wounds and putting the affected areas in the "position for regaining optimum function." This group included all the fractures and joint injuries. Certain short bullet tracks through the superficial parts of trunk and limbs were completely excised from end to end. Others passing through deeper portions of the body were cleansed at their entrances and exits and incisions were made down to the centre of the tracks for drainage purposes. Some larger bullet tracks obviously could not be excised completely. These wounds we left alone, being encouraged by the fact that many of the patients had such wounds of several days' duration, untreated and in a healing state. The problem of the retained projectile was a difficult one. The account given in the History of the Great War (Surgery, vol. 1, p. 49) of the varying types of wounds caused by different projectiles was confirmed. The relative sterility of wounds caused by high-velocity bullets as contrasted with the heavily infected wounds caused by shell and bomb splinters, carrying in with them fragments of cloth, leather, cigarette packets, cuff links and so on, was well seen in our series and it was speedily confirmed that in many cases damage done to the subcutaneous tissues and muscles was much greater than appeared on the surface.

During the early days of the evacuation the patients were X rayed and the fragments shown on the films were carefully followed down through the enlarged wound. In some R.A.F. casualties with very recent wounds complete removal of bullet debris was performed under the X-ray screen. Valuable advice in the location of foreign bodies was given by Major J. H. Anderson, R.A.M.C., our radiologist. Later, however, this procedure was no longer adopted as a routine. At times, with heavy lists to cope with, only life-saving procedures could be performed. Some patients, plentifully peppered with foreign bodies but otherwise all right, could be left alone. Others, barely well enough to stand operation to control hæmorrhage, could not have borne much exploration, and many foreign bodies were therefore left in situ. In less recent wounds, also, we considered that prolonged exploration for fragments among tissues already reacting to the foreign bodies was of doubtful benefit. Fragments not easily accessible were ignored. We did, however, operate to remove fragments where they were provoking pain, causing pressure on important structures or aggravating sepsis.

Our general technique for wounds of the limbs was almost invariably the same, following closely the teaching of Böhler (1935), Trueta (1939) and Tudor Hart (1939a)—i.e., débridement, packing with gauze soaked in proflavine, and immobilisation in plaster-of-paris. One of us (J. J. M. B.) had the opportunity of following up many of these cases in a general hospital, and in the great majority the results were gratifying. The plaster was removed at the end of several weeks, liberating a foul smell and copious pus in many instances. On wiping away the pus the gauze pack was found partially or completely extruded from a clean granulating wound. Similar results were reported from several E.M.S. base hospitals and by Lieutenant I. P. Spurrell, R.A.M.C., who was also able to follow up some of the cases. It is worth repeating that many of these wounds were several days old before this treatment was instituted. Primary suture was hardly ever attempted, and in many cases stitches inserted obviously to control hæmorrhage had to be removed.

In the arm every effort was made to preserve the shattered limb, amputation being almost entirely avoided. Bone fragments were removed as conservatively as possible, the danger of producing non-union and useless flail joints (Frankau 1939b) being realised. Time was considered well spent in dealing with hand injuries, preserving as much as possible of the wounded part. In the lower limb the Thomas splint was preferred to a Whitman plaster case for fractured femora in order to save valuable time. Similarly in a shocked patient with a gunshot wound of the spine the application of a spinal plaster jacket was found to take too long to be practicable.

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A simple dorsal plaster shell made of several stout plaster slabs is advocated in such cases prior to their transfer to a neurological centre. For fractured femora skin strapping with fixed extension and Spanish windlass fixation was found preferable to skeletal extension with the accompanying risk of further sepsis (Weddell 1939). In the field the anklet method of counter-extension with the Thomas splint (Lyburn 1940) would probably be preferable to the clove hitch so often used. Several of our cases had severe pressure grooves round the ankle with signs of commencing necrosis of the skin of the dorsum of the foot, caused by the clove hitch. Amputations were required in several cases and were resorted to more often than in the upper limb. Some traumatic amputations required trimming up. Short flaps, as advocated by Max Page (1939), were preferred to the crude guillotine, and as few sutures as possible were used owing to the risk of producing gangrene (Tudor Hart 1939b).

WOUNDS OF THE CHEST AND ABDOMEN

From our experience the list of indications and contra-indications for operations in wounds of the thorax given in the History of the Great War (Surgery, vol. 1, p. 401) could not be improved on. They are:

1. A ragged wound of the soft parts.
2. Compound fracture of ribs.
3. Bleeding from the parietal wound which continued when the wound was uncovered for examination.
4. Severe pain (often the result of indriven splinters of rib scratching the chest wall with each respiratory movement).
5. An open wound of the thorax, through which air was pumped in and out of the pleural cavity, a so-called "sucking" wound.
6. Crushed ("stove-in") chests, with extensive laceration of the lung by displaced bone.
7. Valve pneumothorax.
8. Large simple hæmothorax in the state of a massive clot.
9. Acute infected hæmothorax.
10. Abdomino-thoracic wounds with injury of the diaphragm, especially on the left side.
11. Retention of a large foreign body.

Many of our cases were at least 48 hours old and in few of these was operation considered. Improvement after closure of open "blowing" wounds of the chest was particularly gratifying (Gask 1939).

The progressive deterioration of patients with untreated abdominal wounds (Gordon-Taylor 1939) was unfortunately well shown by our patients. All abdominal wounds require early exploration. None of our cases was seen within 24 hours and our mortality was consequently heavy. The tendency of buttock wounds to involve abdominal contents was again proved true in our series. Well-marked "peritonism" without damage to hollow viscera or gross intraperitoneal hæmorrhage was met with in several wounds of the buttock and pelvis. Thorough exploration of the wound track avoided unnecessary laparotomy in these cases.

WOUNDS OF THE HEAD AND EYES

Many severe head injuries, most of them of more than 24 hours duration, passed through our hands. The optimum period for operation had unavoidably been passed, and the patients were in a very unfavourable state (Jefferson 1939). Under these circumstances nothing was done beyond local cleansing, and the patients passed on to a neurological centre. Several cases exhibiting pressure symptoms, and in which the gap in the skull was small, were further decompressed.

Eye injuries were treated by Major J. L. Hart, R.A.M.C., the hospital ophthalmic surgeon. On the whole the incidence was low. Three types of eye injuries were observed.

1. *Penetrating injuries.*—In all cases the damage was so extensive that the globe had to be removed. Foreign bodies remaining in the orbit were easily removed, but no intensive search was made for those which had penetrated the apex of the orbit.

2. *Corneal foreign bodies.*—These were usually multiple; they were of varying depth and often associated with subconjunctival foreign bodies. The deep foreign bodies were extremely difficult to remove with no magnet available.

3. *Conjunctivitis.*—In cases associated with facial burns, where the mobility of the eyelids was temporarily lost owing to the tannic-acid coagulum, a secondary bacterial infection developed. Coagulation of burned eyelids was soon abandoned and the lids and surrounding skin treated with saline only. Early Thiersch grafting should be adopted when there is danger of ectropion. Chemosis, due to the explosion of incendiary bombs close by, rapidly subsided under saline irrigations.

BURNS

Twenty extensive second and third degree burns were dealt with. Eight sailors were admitted within 6 hours of their injury; the others at periods ranging from 24 to 96 hours after the burns. All cases exhibited secondary shock or toxæmia on admission. Many had more than half the body surface burned, and were complicated by gunshot wounds. Others had suffered from immersion in the sea.

The routine treatment followed the lines described in detail by Dennison (1939). After appropriate shock treatment with electric cages and morphine the extreme urgency of these cases gave them precedence over many other emergencies for the theatre. Under gas-and-oxygen anæsthesia the traumatised area was rapidly and gently cleansed; 1% gentian violet was then applied and the area was dried with a hair drier. This was followed by the application of tannic acid 10% and silver nitrate 10% (Bettmann 1935). The hair drier was again used. A further application of gentian violet was made, and the patient was returned to bed and again placed under an electric cage. Methylated ether and 1% gentian violet in spirit were applied to the coagulum four-hourly. The tendency to contracture of the joints, particularly the fingers, was counteracted by the application of plaster slab splints wrapped in white lint. Eucortone and desoxycorticosterone acetate proved their value in the treatment of the severe shock and toxæmia in many of these cases. The synthetic corticosterone (Percorten and D.O.C.A.) gave more striking results than the suprarenal extract, and dosage was controlled by means of detailed charts showing hourly pulse, temperature and respiration readings, frequent blood-pressure levels, and the clinical condition of the patients. The usual dose was 10 mg., four-hourly. Fluids and glucose were administered in large quantities by all available routes.

The mortality of the burn cases was 25%, and in view of the extent of the injuries and condition of the patients in hospital we consider this highly gratifying. Several patients were retained until they were well on the road to recovery, with fresh healthy epithelium and without need for grafting. These cases well repay unceasing vigilance and care.

ANÆSTHESIA

Three operating tables were in use in the theatre at the same time, but only one gas-and-oxygen apparatus (Boyle's) was available. As far as possible, therefore, the more seriously ill and complicated cases were anæsthetised with gas and oxygen, the remainder being anæsthetised with the open mask and drop bottle. Economy in gases was necessary owing to the shortage of cylinders. The gas machine was fitted with a three-way expiratory valve, and as soon as induction was completed the valve control was pushed over to the total rebreathing position and then opened the merest fraction, so that a slight head of pressure was created in the reservoir bag, together with a certain unmeasured amount of rebreathing. Using the valve in this way it was possible to reduce the flow of fresh gases to a minimum.

The effect of the anæsthetic on a severely shocked, exhausted and exsanguinated patient was often remarkable. In the early induction period the patient usually reacted as one might expect in a normal muscular adult; then, with little warning, he would quickly descend into the deepest stage of anæsthesia. This was especially noticeable in patients with penetrating wounds of the chest. Three or four breaths of pure nitrous oxide during induction was sufficient to put the patient into the fourth stage of anæsthesia, and a rapid increase of oxygen was urgently necessary. Thereafter it was found that satisfactory anæsthesia could be maintained with an extraordinarily high percentage of oxygen (80–90%). The inefficiency of the Boyle's apparatus caused some anxiety since accurate control of the mixture was impossible.

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With such high percentages of oxygen a McKesson machine, with its certain and rapid control of gas mixture, would have been invaluable. The lack of positive-pressure adjustment was also a great handicap in these cases. An attempt was made to build up pressure in the lungs by closing down the expiratory valve, and turning on the gas taps hard. This could not be done without altering the percentage mixture of gases, with consequent fluctuation in the level of anæsthesia. The machine was equipped only with a water-bottle flow-meter, so that it was almost impossible to regain a satisfactory mixture rapidly once the adjustment had been altered.

Considerable use was made of Magill's intratracheal tubes passed usually by the indirect method through the nose. In penetrating wounds of the chest the catheter was not used, since it was felt that the coughing caused by the insertion of the tube might precipitate or increase hæmorrhage. Two cases demonstrated the danger of indiscriminate passing of intratracheal tubes. These men had sustained a through and through wound of the jaw, involving the root of the tongue. There had been severe hæmorrhage, but this had ceased before they were admitted to the hospital. After induction indirect catheterisation failed, owing to the softness of the tubes. On passing the laryngoscope there was severe hæmorrhage from the tongue before the catheter and packing could be inserted, allowing a quantity of blood to be inhaled. In such cases where there is danger of oropharyngeal hæmorrhage it would probably be advisable to perform tracheotomy, as is done by Japanese surgeons (Weddell 1939), and to administer or continue anæsthesia through the tracheotomy tube.

CONCLUSIONS

A small military hospital had unexpectedly to admit 500 seriously wounded men. The standard of work in such an emergency has to be adjusted to the rate of influx of casualties. The insertion of skeletal extension wires and pins, for example, which would perhaps have been possible in cases early in the list, was out of the question later, in a theatre dealing with sepsis and gangrene.

The depressing reality of Ogilvie's classification of wounded into "Immediate," "May be ready soon" and "Too late" has to be faced. We graded our cases and wrote on the field cards as follows. Changes were, of course, inevitable, but this classification proved satisfactory.

(*a*) Operation + + + (immediate theatre). These cases included burns, sucking chests wounds, early head wounds and penetrating abdominals.

(*b*) Operation + + (for early theatre). These included severely shocked patients needing thorough resuscitative treatment and limb wounds with fractures.

(*c*) Operation + (operation required, but yielding precedence to actual life-saving procedures). These included cases needing colostomy, and non-urgent foreign bodies.

(*d*) Operation — (not for operation in a C.C.S., or beyond surgical hope).

The modern plaster technique for treatment of gunshot wounds is more simple, rapid, and efficacious than the old method of continuous irrigation. It is therefore doubly useful in the conditions of a casualty clearing station; in our series not a single case was treated by the Carrel-Dakin method.

We endorse the recommendation of Japanese surgeons of preliminary tracheotomy for wounds involving the oropharynx.

Catgut was used sparingly and only for main vessels. No nerve or muscle was sutured. Close apposition of wound surfaces was rarely if ever attempted.

The great importance of the preliminary treatment of shock, with the administration of blood when necessary, was clearly demonstrated.

The modern treatment of burns amply demonstrated its value.

We wish to express our thanks to Colonel J. E. Boyd, M.C., commanding officer, for permission to publish this memorandum.

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(*Continued at foot of next column*)

RADIOGRAPHY IN POSTOPERATIVE ILEUS

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ASSISTANT SURGEON TO MIDDLESEX HOSPITAL; AND
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ASSISTANT RADIOLOGIST, E.M.S.

WHEN a fit man is suddenly taken ill with intestinal colic, vomiting, absolute constipation, and distension, the diagnosis of intestinal obstruction is clear and we seldom hesitate to open his abdomen without delay. In many cases, however, the syndrome is incomplete and operation may be withheld too long. Surgeons are therefore coming to rely on the valuable diagnostic help of plain radiograms of the abdomen—i.e., films taken without the use of contrast media.

The basis of the radiological diagnosis of ileus is that gas and fluid, recognisable in the plain radiogram, accumulate in the intestine above the obstruction. In the erect position the association of gas and fluid produces a series of fluid levels; in the supine position the film shows the amount and distribution of gas in the bowel. The pattern and size of the distended loops confirm the presence of obstruction and indicate its site. Those unfamiliar with the technique are apt to condemn the method as too disturbing for a patient ill with intestinal obstruction; but, if the patient is unfit to leave his bed, the radiograms may be taken with a portable apparatus, and he is less disturbed than he would be by an enema.

If the clinical diagnosis of simple intestinal obstruction is often difficult, that of postoperative obstruction is so always, and the decision to operate is harder still to make. The radiological signs of stagnation of the contents of the bowel in postoperative obstruction are just as clear as in obstruction not associated with a recent operation, but their bearing on prognosis and treatment is by no means the same.

This paper is part of a recent study of the radiological diagnosis of intestinal obstruction. Of 75 cases treated at the Middlesex Hospital 18 belong to the postoperative group; most had peritonitis and developed symptoms of the type of ileus usually called paralytic. The plain radiograms were a great help in assessing individual cases, and analysed as a group they clarified our ideas of postoperative ileus in association with peritonitis.

ADYNAMIC ILEUS

Whenever the abdomen is opened, the motility of the gastro-intestinal tract and, to a lesser extent, its secretory and absorptive capacity are disturbed, producing adynamic ileus. This condition is nearly always transient, subsiding, according to Ochsner,[1] in six to twelve hours, and needs no special treatment; but, when there is peritonitis, especially if it is due to bacteria, adynamic ileus persists, and the belly may become greatly distended. All the signs of intestinal obstruction are present save one: there is no peristalsis. This makes diagnosis easy and puts out of court any direct attempt to relieve an "obstruction" by operation. The same applies to the rare instances of severe and persistent adynamic ileus uncomplicated by peritonitis.

In our experience, however, most cases causing anxiety after operation are not of this type. On the contrary, the possibility of focal obstruction needing

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TABLE I—POSTOPERATIVE CASES OF SUSPECTED MECHANICAL OBSTRUCTION IN WHICH SERIOUS OBSTRUCTION WAS EXCLUDED BY PLAIN RADIOGRAPHY

Case	Diagnosis	Operation	Suspected post-operative complication	Days after operation	Radiological finding	Result
1	Carcinoma of descending colon; Paul's resection	Closure of colostomy	Obstruction at site of closure	15	No obstruction, much fæces in colon	Settled down
2	Duodenal ulcer	Partial gastrectomy, anastomosis in Y	Obstruction of jejunal loop	3	No obstruction of loop, colonic stasis	,,
3	Carcinoma of pelvic colon	Laparotomy, cæcostomy	Obstruction unrelieved	13	No obstruction	,,
4	Pyloric stenosis	Gastrojejunostomy	Obstruction of jejunal loop	14	,,	,,
5	,,	,,	,,	3	,,	,,
6	Chronic metritis; oöphoritis	Hysterectomy, oöphorectomy, injury to loop of ileum	Obstruction of ileum	11	Fluid levels, grade II; small bowel distended, grade II; gas in colon	
				12	Moderate degree of ileal obstruction persists	
				18	Signs of ileal obstruction gone	,,

TABLE II—PREOPERATIVE PERITONITIC OBSTRUCTION IN ACUTE APPENDICITIS

Case	Temperature	Findings at operation	Operation	Radiological findings		Colon	Duration of disease (days)
				Levels, grade	Small-bowel distension, grade		
7	101·6° F.	Perforated appendix abscess	Appendicectomy, drainage	II	I	Traces of gas	5
8	101·0° F.	Appendix sloughed off and lying loose in abscess cavity, spreading peritonitis	Slough removed, drainage	Not radiographed in erect position	II	A little gas in transverse colon	14
9	98·0° F.	Greatly reddened and distended small bowel, scanty thin turbid fluid; P.M. perforated appendix	Jejunostomy, drainage	,,	IV	Colon empty, cæcum 5 cm.	11
10	99·3° F.	Perforated appendix, appendix abscess, spreading peritonitis	Appendicectomy, drainage	II	II	Traces only	7

TABLE III—POSTOPERATIVE PERITONITIC OBSTRUCTION (DIFFUSE AND MIXED TYPES)

Case	Final diagnosis	Operation	Radiological findings			Time after operation	Result
			Levels, grade	Distension	Colon diameter (cm.)		
11	Carcinoma of recto-sigmoid junction, postoperative peritonitis	Paul's resection	II	III	Traces of gas	24 days	Laparotomy and division of adhesions 45 days after operation. Recovered.
12	Perforated appendix, spreading peritonitis	Appendicectomy, drainage	II	II	Cæcum 4·0, traces of gas elsewhere	26 ,,	Settled
13	Tubo-ovarian abscess, right and left	Salpingo-oöphorectomy, drainage	II	I	Cæcum 5·5; transverse 3·7; descending 2·6	21 ,,	
14	Appendix abscess	Appendicectomy, drainage	II	III	Cæcum 3·5; traces in rest of colon	31 ,,	,,
			III	IV	Cæcum 6·0; descending 2; pelvic 3	32 ,,	
15	Ulcerative colitis, postoperative peritonitis	Right hemicolectomy	II	II	No gas in remaining portion of colon (old ileostomy present)	7 ,,	Died 10th day
16	Appendix abscess, peritonitis	Appendicectomy, drainage	II	III	Colon not dilated	7 ,,	Settled
10	Appendix abscess, peritonitis	Appendicectomy, drainage	III	III	Cæcum 6·0; pelvis 3·5	7 ,,	Ileostomy 11th day. Recovered
			I	? I	Poor radiogram, ? fæces		
17	Appendix abscess	Appendicectomy, drainage; autopsy (pelvic abscess)	II	II	Traces of gas in cæcum and colon, no excess of fæces	8 months	Died, 9½ months
18	Traumatic rupture of ileum, peritonitis	Suture of ileum, drainage of peritoneum	III	III	Some gas in colon, up to 4·0	1 day	Settled
			III	III	Traces of gas in cæcum, much fæces in colon, up to 5·5	4 days	
			N.R.	0	Small amount of gas	5 ,,	

N.R. = Not radiographed in erect position.

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an urgent operation often arises and presents one of the most difficult problems in surgery. It is here that plain radiograms are a great help.

TYPES OF POSTOPERATIVE OBSTRUCTION

Focal obstruction.—The site of the obstruction is precise—e.g., in the efferent loop of a gastrojejunostomy or at an entero-anastomosis. When vomiting and distension arise a few days after intestinal suture or repair, obstruction at the line of suture is to be suspected. A second operation is notoriously difficult and dangerous. Postponed until the clinical signs are unequivocal, it may be too late; performed earlier it may be unnecessary. Table I summarises 5 cases in which vomiting and distension developed some days after operation, obstruction was suspected but excluded on radiological evidence, a second operation was not done, and all the patients recovered. In case 6 (see below) there was distinct radiological evidence of obstruction.

Diffuse or peritonitic obstruction, often loosely named "paralytic," is usually infective and is the commonest kind of postoperative obstruction. We have included 4 preoperative cases (table II), because they throw light on the origin of diffuse obstruction. All were cases of acute appendicitis of five or more days' standing, with perforation; in each of them the radiograms showed signs of obstruction of the small bowel, but the colon contained only traces of gas, except in case 9, whose cæcum was slightly distended (diameter 5 cm.).

TABLE IV—COMPARISON OF AMOUNT OF OBSTRUCTION AND DISTENSION IN FOCAL AND IN DIFFUSE OBSTRUCTION

Type of obstruction of small bowel	No. of cases	Fluid levels (av. no.)	Distension (av. diam.)
Mechanical	11	2·4	2·4 cm.
Peritonitic { Preoperative ..	4	2·0	2·25 cm.
Peritonitic { Postoperative ..	9	2·2	2·4 cm.

In 9 cases of postoperative peritonitic obstruction (table III) the films demonstrated distinct obstruction of the lower part of the small bowel; large-bowel shadows were a little more evident than in similar cases of obstruction not associated with operation but were never gross and were usually within average limits. Clearly in postoperative obstruction plain radiograms have the same diagnostic and localising significance as in other forms of intestinal obstruction. Positive radiological signs are not in themselves an indication for operation any more than are abdominal distension, vomiting, and constipation.

To compare the degree of obstruction and distension of the small bowel in this series, as estimated radiologically, with the findings in a series of cases of localised obstruction of the small bowel unassociated with recent operation, we have counted the fluid levels and graded them as follows: 1–3 levels, grade I; 4–8, grade II; 9–12, grade III; more than 12, grade IV. Distended loops of small bowel are also graded: up to 2·5 cm. in diameter, grade I; 2·5–4 cm., grade II; 4–5 cm., grade III; more than 5 cm., grade IV. Comparison according to grade shows no difference in the two series (table IV), but the prognosis is vastly different. Few patients with ordinary mechanical obstruction of the small bowel would survive without operation, yet 6 of 9 in the postoperative series recovered without recourse to surgery.

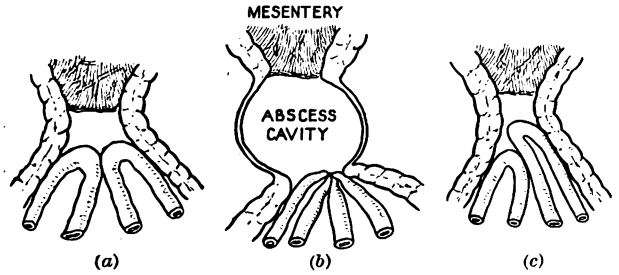
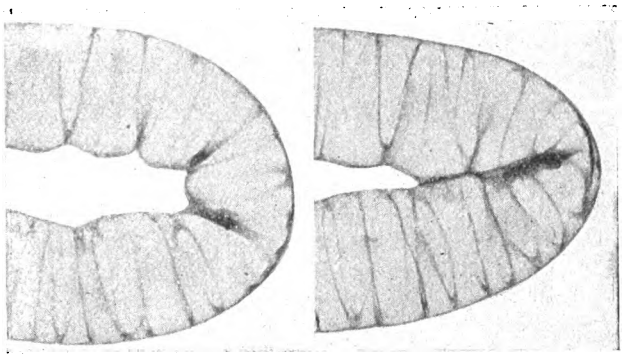


FIG. 2—Diagram showing the mechanical effect of collapse of an abscess cavity: (*a*) abscess forming between mesentery and coils of small intestine; (*b*) fully formed abscess cavity causing obstruction of the intestine; (*c*) coils rendered patent by evacuation of the abscess cavity.

Mixed obstruction, a combination of focal and diffuse, such as may be seen after entero-anastomosis with peritoneal soiling. Narrowing of the lumen of the bowel at the site of suture may be caused by kinking due to faulty sewing or to unsatisfactory lie of the coil but is probably more often due to inflammatory swelling taking some hours to develop and some days to subside.



(*a*) (*b*)

FIG. 1—Coils of jejunum experimentally distended, (*a*) partially, (*b*) completely, to show the acute kinking and consequent obstruction caused by complete distension.

Peritonitis is a common accompaniment; it may be established before operation, as in case 18 (see below), follow contamination at operation, or develop later if the suture line leaks.

Stagnation of intestinal contents is usually thought to be due to paralysis of the wall of the bowel, caused by bacterial toxins acting directly on the muscles or the motor nerves. No doubt paralysis is the essential factor at first, but more powerful elements soon come into play and are responsible for the persistence of signs of obstruction, especially in a patient whose condition causes no great anxiety for three or four days after operation, but who then becomes progressively distended, begins to vomit, has an increased pulse-rate, and is gravely ill. The abdomen is tense, somewhat tender, and tympanitic on percussion; little flatus and less fæces are passed; and there is constant discomfort. Nevertheless the original peritonitis often appears to be subsiding, the temperature is lower, and leucocytosis is less. From time to time, besides the persistent discomfort from distension, there are fleeting sharp pains that become more frequent, and the stethoscope reveals peristalsis, the sounds having a characteristic tinkle. There is no longer general paralysis of the bowel, yet this is just the kind of case that is persistently labelled "paralytic ileus." True, local paralysis may persist; colic may be caused by contractions of the bowel trying to force its contents past an inactive segment, much as it does in localised mesenteric thrombosis.

Many patients at this stage have a localised intraperitoneal abscess, and it may be that segments of bowel in the wall of the abscess are poisoned and paralysed; this is simply an extension of Handley's theory of ileus duplex. Since patients are nursed in Fowler's position, the commonest site for a residual abscess is the pelvis; coils of ileum and the pelvic colon may be affected by the pus. Plain radiograms show, however, that the colon, unlike the small bowel, is seldom conspicuously dilated. The average dilatation of the small bowel is the same as in localised mechanical obstruction. In a series of 30 cases of mechanical localised obstruction of the colon the average diameter of the cæcum was 9·5 cm.; whereas in the peritonitic postoperative cases the maximal diameter was 6 cm., the average being 4·7 cm., and in 2 of 10 unselected patients without demonstrable disease the cæcum measured 4·5 cm.; in 6 cases gas and fæces were present in such small quantities that they could not be measured. Therefore the theory of paralysis is untenable as a complete explanation.

At least four mechanical factors are at work in these cases: (1) the fibrinous peritoneal exudate rapidly becomes sticky and glues the coils of bowel together; (2) the coils of bowel, as they dilate, become cramped for room in the abdominal cavity and can no longer

FIG. 3—Case 18: plain radiogram of abdomen in the erect position, showing several fluid levels.

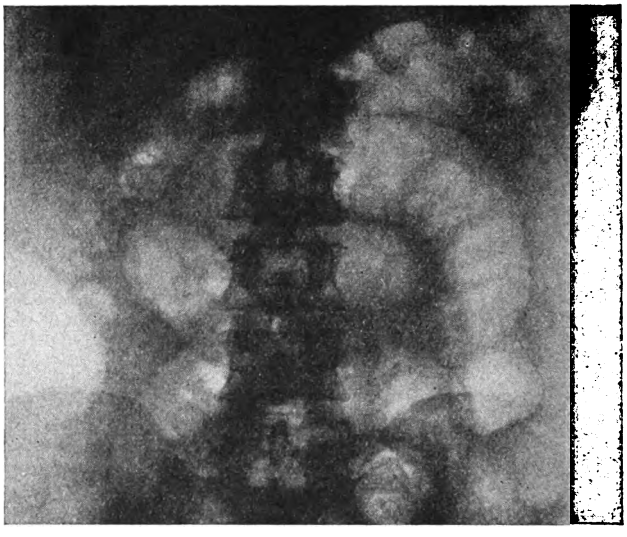


FIG. 4—Case 18: plain radiogram of abdomen in the supine position, showing many distended coils of jejunum and ileum.

writhe freely, with the result that kinks are not reduced and adhesions become fixed; (3) when the bowel becomes distended beyond a critical point, the contractile force of the circular fibres diminishes; and (4) when a coil of tightly distended bowel is bent upon itself, an occlusive kink appears at the bend (fig. 1). The combination of these factors, with or without a "toxic paralytic" element, seems adequately to explain progressive obstruction. Any factor, spontaneous or therapeutic, that overcomes one element in the vicious circle will diminish all and turn the tide in the patient's favour. Once this has happened, recovery is often rapid (cases 6, 10, and 13). Dramatic improvement often takes place after the sudden discharge of pus from the abdominal wound or after surgical drainage of an abscess; the patient is better because toxic absorption is reduced, but distension subsides and bowel function is restored too quickly to be explained on these grounds alone. A simple mechanical way in which the collapse of an abscess cavity can remove the obstruction is shown diagrammatically in fig. 2.

After two or three weeks, fibrinous adhesions have organised, the walls of any residual abscess have toughened, and threatened obstruction may be precipitated. It will be noted that 4 of our patients were radiographed as long as twenty to thirty days after operation because of signs of obstruction. The fact that all recovered without a further operation will astonish no-one who has evacuated an appendix abscess and removed the appendix three months later without finding any trace of adhesions.

The outcome is not always so good; some people form adhesions as readily as others dissolve them, and there is always the possibility of sudden obstruction by a single band. This accident is not difficult to diagnose, because the onset is sudden. Immediate operation is required, just as in similar obstruction unrelated to a recent operation.

ILLUSTRATIVE CASE-RECORDS

CASE 16.—Male, aged 72. Operation: July 2, 1937, appendicectomy and drainage for perforated appendix. Distension was noticeable on the fourth day and increased progressively; less and less flatus was passed; on the seventh day he vomited, complained of considerable abdominal discomfort, with occasional colicky pains, and had audible peristalsis.

Plain radiograms: July 9; fluid levels, grade II; several distended loops of jejunum and ileum, grade III; colon not dilated. Diagnosis: typical peritonitic (infective) obstruction. Course: intravenous saline drip, no fluid by mouth, repeated ox-bile enemas. Bowels opened spontaneously after third enema; rapid clinical improvement; patient discharged to his home twenty-three days after operation.

CASE 6.—Female, aged 36. Operation: Jan. 18, 1940, total hysterectomy and left salpingo-oöphorectomy. The left ovary was densely adherent to a loop of lower ileum, which was denuded of peritoneum and patched with difficulty. The postoperative course was smooth until the fifth day, when she had colicky pain; this increased, and on the tenth day she vomited and was found to have slight distension and loud audible peristalsis.

Plain radiograms: Jan. 29, fluid levels, grade II; a few coils of small bowel of ileal type, grade II; small amount of gas in colon, up to 3·7 cm.; cæcum not distended. Diagnosis: moderate degree of obstruction in lower ileum. Food discontinued and drinks curtailed.

Jan. 30, levels, grade II; small bowel distended, grade II; colon contains more gas; diameter of cæcum 4·5 cm. Clinical condition improved steadily.

Feb. 2, no fluid levels; no definite loops of small bowel; some gas and fæces in colon; all signs of obstruction gone. Patient made an uninterrupted recovery.

There was no evidence of peritoneal infection in this case; the patient remained afebrile. The exciting cause of stasis of the small bowel was presumably reactionary œdema and fixation of the injured coil of ileum. This led to distension of the bowel and the beginning of the usual vicious circle. Curtailment of ingested fluid and food prevented further distension of the bowel, the peritonitic reaction about the injured coil at this time began to subside, and the threatened obstruction was overcome.

CASE 18.—Male, aged 58. Operation, Feb. 9, 1940, revealed a rent 1 in. long in a loop of ileum, caused by a blow on a large inguinal hernia three hours before, with soiling of the peritoneal cavity. The bowel was sutured transversely and the peritoneal cavity drained. An intravenous saline drip was set up immediately and all food and drink forbidden. Thirty-six hours later the man was much distended and vomiting.

Plain radiograms: Feb. 10, fluid levels, grade III; several jejunal and ileal coils, grade III; most of colon outlined but did not exceed 4 cm. in diameter (figs. 3 and 4). Diagnosis: typical peritonitic obstruction. Continuous stomach suction was begun. There was little change in condition.

Feb. 13, fluid levels, grade III; several loops of jejunum and ileum, grade III. Miller-Abbott tube had passed the pylorus. Considerable amount of fæces in colon, diameter 5·5 cm.; trace of gas in cæcum. As soon as the Miller-Abbott tube passed the pylorus, the man's condition began to improve.

Feb. 14, supine position only; 4 ft. of tube in the small bowel; no coils of small bowel seen; small amount of gas in cæcum and left colon. Convalescence uneventful, bowels open regularly.

RADIOGRAMS AS INDEX TO TREATMENT

If radiography shows that the colon is distended with gas and the small bowel is not, passage of a flatus tube is the obvious procedure; if the colon is distended with

fæces, an enema will succeed. If the small bowel is distended and there are fluid levels, no food and little or no fluid should be taken. If improvement is not rapid, the stomach should be continuously aspirated through a duodenal tube or, better, a Miller-Abbott tube, which is especially useful in the severer cases, because it deflates the small bowel and so breaks the vicious circle of peritonitic obstruction.

Serial radiograms and intestinal drainage by suction are complementary. Suction effects rapid clinical improvement but does not necessarily relieve the obstruction. If plain radiograms do not give evidence of the disappearance of obstruction, a small quantity of barium emulsion should be injected into the tube; if this does not pass the obstruction it should be sucked back. If obstruction persists, reliance on the clinical condition alone may lead to dangerous procrastination.

SUMMARY

Most cases of postoperative ileus causing anxiety are due either to focal obstruction at the line of suture or, more commonly, a diffuse or peritonitic obstruction.

Plain radiograms give evidence of obstruction in both types of case.

In 5 cases of suspected focal obstruction, radiography excluded obstruction, no operation was performed and the patients recovered. In 9 cases of peritonitic obstruction, radiography demonstrated obstruction of the small intestine.

In cases of obstruction, plain radiograms taken in the erect position show distension of the small bowel with fluid levels in the distended loops.

In cases not requiring immediate operation intestinal drainage by suction through a duodenal or Miller-Abbott tube should be combined with serial radiography. Reliance on clinical signs alone may lead to dangerous delay, but radiography will show whether the obstruction is persisting.

TREATMENT OF PNEUMONIA WITH SULPHAPYRIDINE AND SERUM

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In a previous paper (1939) we reported the results of the treatment of a series of pneumonias due to pneumococcus type II. We concentrated at that time on type II, because the cases due to the other types were too few for analysis. It is now possible to extend the report and to include the results in infections due to pneumococci of types I, II and III, 217 cases in all. They include the 70 type-II infections previously reported, and represent a continuous series in which types I, II or III have been recovered from sputum, blood, purulent exudate or a combination of these. All have been under our supervision in Ruchill Fever Hospital, Glasgow, and since this hospital receives cases from a wide area of the city the series may be regarded as representative. The methods of study are as previously reported.

CASES TREATED WITH SULPHAPYRIDINE

Sulphapyridine was given to 197 cases in the series, an initial dose of 2 g. being followed by 1 g. at 4-hourly intervals. Treatment usually extended over a period of 6–8 days. One of us (J. G. C.) made total and differential counts of the white blood-cells in many of the cases before and during treatment. Although most of the cases were lobar we believe in the importance of an ætiological classification and the series therefore includes a number of primary adult bronchopneumonias; indeed, in the type-III infections the atypical pneumonias predominate. Table I shows the numbers and the age- and sex-distribution. The age-distribution in the different types is not unusual and is similar to that noted by Cruickshank (1933).

Type-I infections.—Of the 47 cases, 6 were not treated with sulphapyridine in hospital, because they had received the drug prior to admission and recovery had begun. Blood-cultures were taken from 29 of the rest before treatment was started; 8 (27·6%) were positive. One patient developed sudden membranous obstruction of the larynx in convalescence and died after tracheotomy. There were no other deaths. The main complications were: sterile pleural effusion, 4 (8·5%); empyema, 3 (6·4%); chronic pulmonary fibrosis, 1 (2·1%).

Type-II infections.—Since our last publication, 42 more cases have been treated with sulphapyridine alone, making a total of 112. Blood-cultures were taken from 94 patients on their admission to hospital, 30 (32%) giving positive results. There were 14 deaths (12·5%). Seven patients died within 24 hours of admission; their average age was 57 years and the average duration of illness prior to admission 7 days. If these are excluded the fatality-rate is reduced to 6·6%. The main complications were: sterile pleural effusion, 10 (8·9%); empyema, 4 (3·6%); venous thrombosis, 1; corneal ulceration, 1; lung abscess, 1; pneumococcal meningitis, 1.

Type-III infections.—There were 38 cases. Blood-culture was taken on 33 patients on admission to hospital and was positive in 11 (33%). There were 11 deaths (29%). Of the 11 bacteræmic cases only 4 recovered. Three patients died within 24 hours of admission; their average age was 58 years and the average duration of the illness on admission 3·3 days. If these are removed from the series the fatality-rate becomes 23%. The following were the main complications: sterile pleural effusion, 2 (5·3%); empyema, 5 (13·1%); venous thrombosis, 1 (2·6%).

TYPE-II INFECTIONS TREATED WITH DRUG AND SERUM

This group comprises 20 patients admitted to hospital in the first 3 or 4 days of their illness who were considered to be severely ill; they were not selected on any other grounds. They were admitted at intervals during the winter of 1939–40, and were given sulphapyridine followed by type specific antipneumococcus serum in doses which would be considered inadequate had either been given singly. After the administration of the immune serum no further specific treatment was given. A "concentrated and refined" serum (20,000 units in 3·5 c.cm.) prepared by the immunisation of rabbits was used.[1]

Horsfall and his colleagues (1937) believe that unconcentrated type-specific rabbit serum is at least as effective as concentrated horse serum in the treatment of pneumonia. It is readily produced, costs less and is easy to give. The molecule of the rabbit antibody (being smaller than that of the horse) may possibly be more diffusible.

Combined treatment was adopted for various reasons: despite the beneficial effects of sulphapyridine in type II pneumococcus pneumonia there was still an appreciable fatality-rate; sulphapyridine frequently gave rise to severe gastric discomfort with nausea and vomiting which made it necessary to stop treatment; moreover the process of resolution often seemed to be slowed down, suggesting that some stimulus to resolution had been inhibited; finally, Fleming has suggested (1938) that drug and immune serum in combination may enhance each other's action.

A general plan of treatment was followed. After a blood culture and a specimen of sputum for typing had been taken, a 2 g. dose of sulphapyridine was administered, followed by doses of 1 g. at 3–4 hourly intervals so that an average total of 6–7 g. (maximum 10 g., minimum 4 g.) was given within 12–16 hours of admission. During this time the patient's sensitivity to rabbit serum was tested by the instillation of a few drops into the conjunctival sac. The pneumococci in the sputum were typed. The patient was then given an initial dose of 20,000 units of rabbit serum intravenously, followed 2–4 hours later by the main dose of serum, usually from 40,000 to 60,000 units. In a few cases a third dose (40,000 units) was given 6 hours later, the average total dose being 70,000 units (maximum 120,000, minimum 40,000). No further treatment was given.

Clinically the immediate results were striking; there was invariably a sudden and rapid improvement within 12 hours after the first administration of serum; not merely was the temperature subnormal but the patient looked and felt exceedingly well. In other words the illness terminated in a manner more akin to the normal

1. Kindly supplied by Messrs. Lederle, New York.

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crisis than usually happens after sulphapyridine alone. That the group of patients was a fair sample of the type-II cases is suggested by the fact that bacteræmia was present in 7 (35%) on admission to hospital. There was 1 death, due to the development of a purulent pneumococcal pericarditis. The other complications were: sterile pleural effusion, 2 (10%); empyema, 1 (5%).

TABLE I—AGE- AND SEX-DISTRIBUTION IN WHOLE SERIES
(DEATHS IN PARENTHESES)

Age	TYPE I		TYPE II Drug only		TYPE II Drug + serum		TYPE III	
	M.	F.	M.	F.	M.	F.	M.	F.
Up to 19 ..	7	2	16	6	2	1	2	1
20–29 ..	12	7 (1)	20 (1)	7	4 (1)	3	2 (1)	1
30–39 ..	6	0	14 (1)	3	2	0	0	1
40–49 ..	3	0	12 (1)	10 (4)	4	2	5 (1)	3
50–59 ..	7	2	8 (2)	7	0	2	13 (5)	6 (1)
60–69 ..	1	0	2	4 (2)	0	0	2 (2)	2 (1)
70 and over	0	0	3 (3)	0	0	0	0	0

M. = male. F. = female.

Although toxic effects attributable to sulphapyridine were absent, there was a high incidence of delayed serum-sickness, 8 (40%) of the cases showing a reaction. This agrees with the experience of others who have used rabbit serum. Horsfall and his colleagues report that 12 out of 22 patients showed late reactions, while Brown and Finland (1939) reported late reactions in 5 out of 9 patients. With horse antiserum in the treatment of pneumonia similar high rates have been reported, although, of course, a much larger bulk of horse serum is usually administered. In our series the reactions were alarming in two cases and included pyrexia, rash, arthralgia, œdema of the face and general malaise for 7 days in one case and 11 in the other. In the other cases the duration was 2–4 days. Arthralgia and rash were noted most commonly; in one case myalgia with fibrositis was severe, while in another the only abnormality was general enlargement of lymphatic glands. The time of onset after administration of the serum was early in 2 cases (4 days) but in the remainder was 9–11 days. There was no obvious relation between the amount of serum given and the incidence of serum-sickness; only one received 100,000 units, while in the remainder the dose was 60,000 units. In none was there any immediate reaction to the intravenous injection.

DISCUSSION

Sulphapyridine therapy does not alter the fact that the fatality-rate in pneumonia varies from type to type. In treated cases, type III still remains the most fatal, then type II; type I, in the present series, gave rise to no deaths. Gaisford (1939) has suggested that the sterile pleural effusions so frequently encountered represent the empyemata which drug treatment has prevented. We do not agree with such a simple explanation. One of us had considerable experience of typed pneumococcal pneumonias between 1931 and 1934. At this time there were twice as many empyemata due to type I pneumococcus as there were to type II. A similar predominance of type I pneumococcus as a cause of empyema has been noted by Cruickshank (1933). Table II shows that although the incidence of empyema in type-I infections is still appreciably higher than in type-II, sterile pleural effusions occur with equal frequency in the two types. This suggests that the occurrence of a sterile effusion is unrelated to the type of infecting organism.

TABLE II—RESULTS IN WHOLE SERIES

—	TYPE I Drug only	TYPE II Drug only	TYPE III Drug only	TYPE II Drug + immune serum
Number of cases	47	112	38	20
Fatality-rate %	0	12·5	29	5
Fatality-rate % (excluding cases dying within 24 hrs.)	0	6·6	23	5
Fatality-rate % (bacteræmic cases)	0	23·3	63·6	14·3
Sterile pleural effusion rate %	8·5	8·9	5·3	10
Empyema rate %	6·4	3·6	13·1	5

Bacteræmia has a serious prognostic significance. Bullowa and Wilcox (1935) state that the fatality-rate in bacteræmic cases is at least double that in non-bacteræmic cases due to the same type. Our figures indicate that this holds true despite drug treatment. The cases which received combined drug and serum therapy are too few for strict analysis but the immediate clinical result was gratifying. It might however be said in criticism that most of them would have recovered with greater amounts of sulphapyridine without the addition of serum and the discomfort of serum-sickness. The results are not however inferior to those obtained with much larger doses of the drug alone and we consider combined treatment worthy of further trial. Its immediate crisis-like benefit must be balanced against intolerance of the larger doses of sulphapyridine on the one hand and serum-sickness on the other.

The results of drug treatment in the type-III infections are disappointing, although the group has been somewhat unfortunate in that the occurrence of five empyemata in such a small sample is unusual. Only one lived long enough to permit of operation. If the high fatality-rate occurring in our type-III infections is to be regarded as a normal experience, reliance on sulphapyridine alone is unjustifiable and the findings suggest that the combination of specific type-III serum and drug merits consideration. Age remains an important factor in the prognosis of pneumonia, despite drug treatment. In the type-II infections the fatality-rate under 40 years was 3·8%; over 40 years it was 22·2%. In the type-III cases the figures were 14·3% and 32·2%. The high fatality-rate over 40 years is disquieting and suggests that reliance on sulphapyridine alone is unwise. The combination of serum and drug should be investigated further, especially in this age-group and when bacteræmia is present.

TABLE III—FATALITY-RATE IN SULPHAPYRIDINE SERIES COMPARED WITH THAT OF CASES TREATED BEFORE THE INTRODUCTION OF CHEMOTHERAPY

Period	TYPE I		TYPE II		TYPE III	
	Total	Fatality-rate %	Total	Fatality-rate %	Total	Fatality-rate %
1931–34	215	8·4	216	28·2	31	22·6
1938–40	47	2·1*	132	11·4	38	29·0

* The single fatality in type I (from laryngeal obstruction) is included for statistical purposes.

A considerable delay in the resolution of the consolidated lung continues to be observed in patients treated with sulphapyridine. The drug seems to prolong the period of resolution. In many cases the chest has remained stony-dull to percussion for two or three weeks after the temperature has fallen. The physical signs are often suggestive of fluid but paracentesis yields negative results. At present the reason for this delay remains obscure. Between 1931 and 1934 a series of cases was treated by one of us in the same hospital on non-specific lines, and a comparison of the results of the two methods of treatment (table III) demonstrates that a great saving of life has followed the use of sulphapyridine. But there is still much room for improvement, especially in type-III infections.

SUMMARY

1. Of 217 cases of infection due to pneumococci types I, II and III, 197 were treated with sulphapyridine alone and 20 with sulphapyridine and serum.

2. Of 47 cases of type-I infection treated with sulphapyridine there was 1 death; of 112 cases of type-II infection, similarly treated, 14 died; of 38 cases of type-III infection, 11 died. Resolution seems to be prolonged by the use of sulphapyridine.

3. In all the patients treated with combined drug and serum, there was striking clinical improvement within 12 hours, but 1 died later of pericarditis. No toxic effects due to sulphapyridine were seen, but 8 patients showed delayed serum-sickness.

4. The relative virulence of the various types was not disturbed by sulphapyridine therapy: type III remained the most, and type I the least, fatal.

5. The age of the patients affects prognosis. In type-II infections the death-rate was 3·8% in patients under 40 and 22·2% in patients over 40; in type-III infections the corresponding rates were 14·3% and 32·2%.

6. The death-rate in bacteræmic cases was at least double that in non-bacteræmic cases due to the same type.

We wish to thank Dr. W. M. Elliott for permission to carry out the investigation; Messrs. C. F. Thackray for supplies of rabbit serum; Mr. T. B. Gallie for technical assistance; and Sisters Grant and McFiggins for their coöperation.

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SULPHATHIAZOLE IN TREATMENT OF PNEUMOCOCCAL LOBAR PNEUMONIA

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MOST of the more important information now available concerning 2 (para-aminobenzenesulphonamido) thiazole, generally known as sulphathiazole and also in this country as M. & B. 760 and Thiazamide, has been summarised in leading articles in the *Lancet* (May 11, 1940) and the *British Medical Journal* (June 22, 1940). The majority of the clinical reports have described studies of the usefulness of the drug in the treatment of staphylococcal infections and the only published clinical trials in pneumococcal infections are those of Gsell (1940), and of Flippin et al. (1940) who treated 100 cases of pneumococcal pneumonia of different types with a 12% mortality.

It was decided to employ sulphathiazole in a series of pneumococcal lobar pneumonias at Dudley Road Hospital and to use alternate patients treated with sulphapyridine as controls. Children were not included since they tolerate sulphapyridine so well that it seemed unnecessary.

The first case to receive the drug was admitted on April 3, but the admissions of cases of lobar pneumonia to hospital this spring and summer have been the fewest on record, and this has been the experience we understand at other large hospitals in Great Britain. Any hope of our being able to produce an adequate number to be of statistical value was soon found to be out of the question, and this report refers to only nineteen cases.

We adopted a similar method of investigation to that employed in our original study of sulphapyridine (Evans and Gaisford 1938)—namely, strict clinical criteria of diagnosis, X-ray examination, sputum typing and daily blood-counts. In addition, the assistance of a whole-time technician allowed us to make full biochemical investigations, frequent blood-level determinations (on an average 10 in each patient during the 48 hours of treatment and the subsequent 24 hours), daily red-cell counts, hæmoglobin estimations, as well as differential blood-counts being made. Every possible specimen of urine was examined for sulphathiazole content, albumin, casts and cells, and on an average 12 specimens of urine were examined chemically and microscopically for each patient. Fractional test-meals were also carried out in a number of the control cases receiving sulphapyridine to see if the vomiting was in any way related to the amount of hydrochloric acid present in the stomach, or whether this level was affected by the drug, but the results obtained were inconclusive.

The dosage employed was similar to that with sulphapyridine—namely, 2 g. (4 tablets) on admission and repeated 4-hourly for three doses and then 1 g. (2 tablets) 4-hourly for 24 to 36 hours, as necessary, ending the course with 1 tablet three times or twice during the final 24 hours after the temperature had fallen to normal. One patient was given an initial intravenous dose of a solution of the sodium salt containing 1 g. of sulphathiazole in 20 c.cm. of normal saline, followed by a similar one after 4 hours, treatment being then continued by mouth. The average total dosage was 14·5 g. Intramuscular injection was not used in any case.

RESULTS

It was only because we found no evidence that sulphathiazole was superior or equal to sulphapyridine in the treatment of pneumococcal lobar pneumonia that it was thought worth while placing on record this preliminary note, for there were but ten cases of true lobar pneumonia treated with sulphathiazole during the investigation. Two other cases were also investigated, but radiography revealed no evidence of consolidation. There were no deaths and only one patient had any complication—a man of 55 with a type II pneumonia who developed an empyema which was subsequently drained and a good recovery resulted. During the same period there were no deaths among the nine sulphapyridine cases and only one with a complication—a sterile serous effusion. Pneumococci were isolated from five of the cases receiving sulphathiazole, three being type II, one type III and one type IV.

TYPICAL RESULTS OF BLOOD EXAMINATIONS ON A SINGLE CASE TREATED WITH SULPHATHIAZOLE

Day of disease ..	2nd	3rd	4th	5th
Red cells per c.mm. in millions	5,080	5,380	5,460	4,780
Hæmoglobin % (Sahli) ..	102	103	106	100
Colour-index	1·0	0·97	1·0	1·0
White cells per c.mm. ..	35,200	31,800	17,100	11,100
Polymorphonuclears % ..	84	88	85	68
Lymphocytes (small) % ..	8	5	10	19
,, (large) % ..	0	3	—	1
Hyalines %	0	4	2	8
Eosinophils %	0	0	0	3
Basophils	0	0	0	0
Myelocytes %	1	0	1	0
Metamyelocytes % ..	7	0	2	1

Fall in temperature.—The rapid fall in temperature seen with sulphapyridine was not so striking in the cases treated with sulphathiazole, and in nearly all of these there was a 12-hour lag, so that the average time between the beginning of treatment and the fall in temperature was 36–48 hours. Characteristic temperature charts of cases treated with the two drugs are shown in figs. 1 and 2.

Nausea and vomiting.—Only one patient who received sulphathiazole vomited and none complained of nausea. It was by no means certain in the patient who did vomit that this was due to the drug since he had done so repeatedly before admission. One nurse, not included in this series, who had severe nausea and vomiting when treated with sulphapyridine last year showed no signs of intolerance to a course of sulphathiazole in May, 1940.

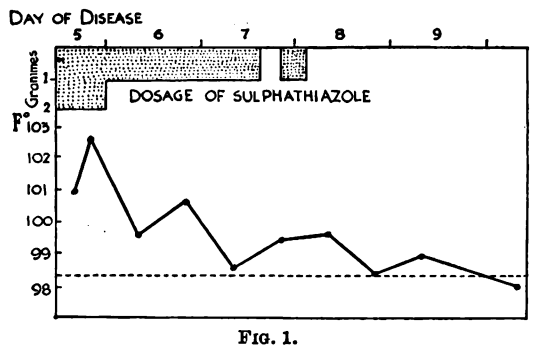

FIG. 1.

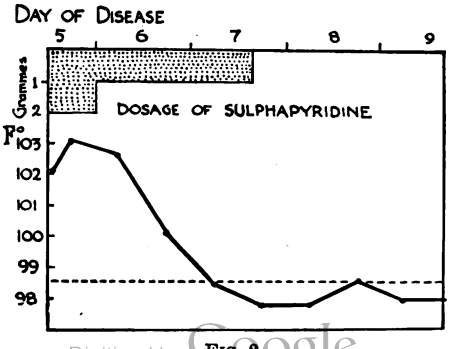

FIG. 2.

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Blood-counts.—In none of the cases treated with sulphathiazole was there any significant alteration in the blood-count as the result of the treatment. The number of red cells and the hæmoglobin percentage remained almost constant in each case and no differential count showed any tendency to granulopenia, as may be seen in the table, which is representative of our findings.

Blood levels.—Fig. 3 shows graphically the maximum and minimum blood concentrations of free and total sulphathiazole obtained in two cases (A and B) with details of the oral administration of the drug. The curves for the remaining patients lay between these two with one exception where there was a delay in the rise of the blood level for 18 hours, but this patient eventually attained a concentration of 14·2 mg. per 100 c.cm. of total and 13·5 mg. per 100 c.cm. of free sulphathiazole and maintained high concentrations for some time after the dosage had been reduced. This retention of the drug was probably due to renal dysfunction, albumin and casts being present in all specimens of urine examined both before and after treatment. There is insufficient evidence to enable us to suggest an optimal blood concentration, since excellent clinical results have been obtained when the blood contained as little as 3 mg. per 100 c.cm. of the unchanged drug and poor results have been noted with much higher levels.

Action on urinary system.—Experimental work in animals has suggested that renal damage might occur after sulphathiazole, and cases of hæmaturia, anuria and concretions in the tubules have been reported clinically in America and this country. These findings are not

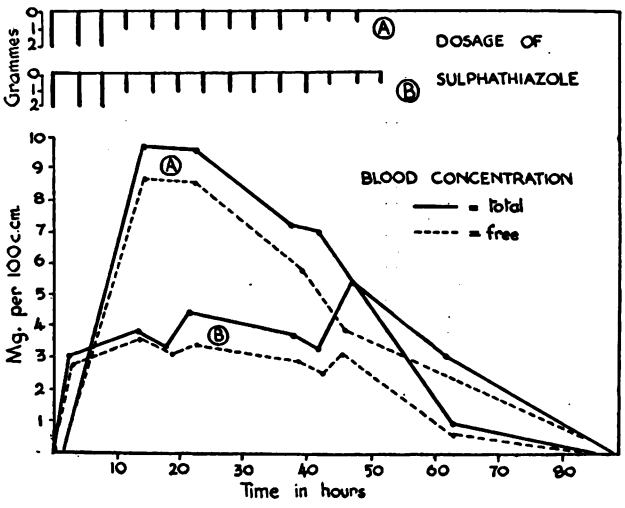

FIG. 3.

surprising in view of the fact that the acetyl derivative of sulphathiazole is even less soluble than that of sulphapyridine; but in our cases, apart from transient albuminuria seen before treatment was begun and representing a not unusual febrile phenomenon, there was no evidence of any renal damage and no red cells or casts were seen.

CONCLUSIONS

This preliminary trial of sulphathiazole in ten cases of pneumococcal lobar pneumonia has shown that the drug is of value and acts similarly to sulphapyridine, though producing a less prompt fall in temperature. With this temperature lag there is a correspondingly longer period of acute illness. This renders sulphapyridine the drug of choice in severe cases.

The chief point in favour of sulphathiazole is that it does not cause vomiting.

It is possible that a combination of sulphapyridine and sulphathiazole may come to be a valuable routine in the treatment of pneumonia, the first large doses given being sulphapyridine (e.g., the first 8 tablets) and the following ones sulphathiazole. In this way vomiting can be obviated entirely. An alternative is the use of a mixture of the two drugs from the outset—e.g., 2 tablets of sulphapyridine given with 2 tablets of sulphathiazole four-hourly for the first three doses, and then 1 tablet of each. The first method has already been used since these investigations were undertaken with very satisfactory results.

We are indebted to Dr. T. M. Anderson, medical superintendent of the hospital, for permission to publish these cases; to Messrs. May and Baker for supplies of sulphathiazole; and to Mr. W. A. Freeman who carried out the biochemical investigations.

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TOXIC MANIFESTATIONS OF CALCIUM THERAPY IN HEART FAILURE

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WITHIN recent years intravenous administration of calcium gluconate has been employed in the treatment of cardiac failure. Although at times beneficial this procedure is not entirely without risk.

In animals large intravenous injections of calcium salts lead to a very rapid reduction of blood-pressure, inhibition of the cardiac and respiratory movements and arrest of urinary secretion. Smaller injections produce changes in the tonus of skeletal muscles. In man an intravenous injection of 4 c.cm. of a 10% solution of calcium chloride has produced dizziness, collapse, respiratory embarrassment and generalised muscle spasm; recovery ensued in five minutes (Lloyd 1928). The rate of injection was not reported but in view of later findings it is almost certain that the solution was given too rapidly. Liebermann (1933) states that while very large amounts of calcium can be given if the rate of administration is sufficiently slow even small doses may prove fatal when given quickly. McGuigan and Higgins (1938) stress the importance of this and suggest that the administration of 10 c.cm. of a 10% solution of calcium gluconate should take at least two minutes. When this rate is not exceeded there is little discomfort. The first sensation to be experienced by the patient is a feeling of heat in the mouth, sometimes associated with a metallic taste. A sense of heat is complained of at the site of injection; this rapidly spreads over the surface of the body. In some cases there has been slight flushing of the cheeks and in others a slight and transient increase in the respiratory rate. In all over 100 patients have been given injections of 10% calcium gluconate. There were no febrile reactions and only 2 developed any serious symptoms and in both this was due to digitalisation.

CALCIUM AND DIGITALIS

It is obvious that if calcium is to be used clinically careful consideration must be given to the possibility of toxic effects arising from its combination with digitalis. The work done on the pharmacology of calcium has demonstrated a close similarity between its action and that of digitalis.

Loewi (1918) stressed the close relationship between the actions of the two drugs on the heart and even suggested that the main effect of the digitalis glucosides was obtained by sensitising the heart muscle to calcium. Cheinisse (1922) was of the opinion that calcium enhanced the action of digitalis in patients with cardiac œdema. Our own results with œdematous patients appear to support this hypothesis. According to Billigheimer (1924) the actions of calcium and digitalis are similar except that those of the former are more transient. He found that no ill effects resulted from using the two in combination, and indeed he recommended this in order to obtain the combined action. Gold and Edwards (1927) were able to reduce the minimum lethal dose of ouabain in dogs by producing hypercalcæmia. Mandelstamm (1926) found that the effect of strophanthin in rabbits was enhanced by increasing the calcium content of the cardiac muscle but that the glucoside did not sensitise the heart to

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calcium. Nahum and Hoff (1937) obtained no increase in the calcium effect on the rabbit heart after large doses of digitalis. On the other hand Fischer (1928) and Nyiri and Dubois (1930) in frogs found that digitalis increased the action of calcium on the heart. Golden and Brams (1938) working with dogs obtained a lower M.L.D. of calcium after the intravenous administration of one of the digitalis glucosides and La Barre and Van Heerswynghels (1939) reported that digitalisation of cats rendered them much more susceptible to the action of calcium.

It seems wise, therefore, to be cautious when calcium is being given intravenously to a patient whose tissues contain a considerable amount of digitalis glucosides. The administration of digitalis by mouth to a subject with hypercalcæmia is not, however, likely to be dangerous since the digitalis is relatively slow in affecting the heart.

Bower and Mengle (1936) were the first to state definitely that it is dangerous to use calcium and digitalis simultaneously. An unfortunate experience in two cases led them to this conclusion. Both patients were fully digitalised when they received intravenous injections of calcium salts and both died within a few minutes. The problem was then investigated in dogs and it was found that although previous digitalisation reduced the M.L.D. of calcium previous administration of calcium had no effect on the M.L.D. of digitalis.

ILLUSTRATIVE CASES

In the past three years the effect of calcium therapy has been investigated in 110 patients, of whom 2 developed symptoms of poisoning which are probably to be attributed to a combined calcium-digitalis effect.

CASE 1.—A woman, aged 30, was admitted to Stobhill Hospital on Feb. 8, 1938 with severe dyspnœa, cyanosis and extensive œdema and auricular fibrillation. There was a history of cardiac trouble dating from an attack of acute rheumatism in childhood. She was given rest, appropriate diet, digitalis and Mersalyl. Improvement was noted, but some cyanosis still remained and the œdema was not much reduced. The heart remained irregular. After 23 days on digitalis (pulv. digitalis gr. 6 daily) she was given a daily intravenous injection of 10 c.cm. of 10% calcium gluconate, while digitalis therapy was continued. On March 7, after the fourth injection of calcium gluconate, the heart slowed considerably and coupling of beats was noted. Calcium and digitalis were then stopped. On the 10th digitalis was resumed but was stopped again on the 16th owing to the appearance of numerous extrasystoles verified by electrocardiograph tracings. On the 19th digitalis was again given for two days, but again had to be stopped because of a fall in pulse-rate and the reappearance of extrasystoles. On the 22nd, 23rd and 24th 10 c.cm. of 10% calcium gluconate was given intravenously once daily. Half an hour after the third injection the patient had a severe rigor lasting for three-quarters of an hour and she vomited and became very cyanosed. The heart-rate jumped from 44 to 132 per minute. The cyanosis and tachycardia persisted until the patient died twelve hours later. Permission for post-mortem examination was not granted.

It is difficult to be certain that the patient would not have died without calcium therapy, but the events were sufficiently dramatic to make one sensible of the danger of administering calcium intravenously to anyone receiving digitalis.

CASE 2.—A man, aged 52, had had his right leg amputated in 1937 because of arterial embolism and gangrene. He was admitted to Stobhill Hospital on April 4, 1938, suffering from embolism of the left femoral artery. Expectant treatment was adopted and eventually the big toe and the distal part of the second toe developed dry gangrene. The condition was complicated by severe cardiosclerosis; the heart sounds were almost inaudible, the blood-pressure was 105/80, and the lips were cyanosed. The cardiac rhythm was regular. After the acute conditions had subsided and the gangrene had developed, œdema appeared in the foot, ankle and to a slight extent in the leg up to the knee. Pulv. digitalis gr. 1 t.i.d. was given from May 2 till June 3, but the œdema was unchanged. Accordingly, 10 c.cm. of 10% calcium gluconate was given on June 3, 4, 6, 7 and 8. The œdema persisted and since there was no improvement in the general condition the injections of calcium gluconate were stopped; the digitalis was, however, continued. On the afternoon of June 9 the patient vomited and the heart-rate fell by 20 beats per minute. Next day there was striking clinical improvement and three days later the œdema had completely disappeared.

In this case digitalis had been given for 32 days before the administration of calcium without evidence of response. Calcium seems to have increased the sensitivity of the patient to the drug and led to the production of toxic symptoms.

These two experiences decided us to make it a rule not to give an intravenous injection of calcium gluconate until at least four days after the last dose of digitalis. In this interval if a patient has been receiving full doses of the drug and is completely saturated the amount of digitalis in the tissues will be reduced by the excretion of gr. 8–9—i.e., by about 35%. Since this procedure was followed no toxic effects have been observed, although many patients with varying degrees of heart failure have received intravenous injections of calcium gluconate.

SUMMARY

The intravenous injection of 10 c.cm. of 10% calcium gluconate does not lead to toxic manifestations provided at least two minutes are allowed for the administration.

Literature is summarised indicating the additive effects of digitalis and calcium on the heart.

Two cases are described showing the danger of giving calcium gluconate intravenously to digitalised patients. It is recommended that when patients are receiving digitalis this drug should be stopped for four days before calcium is administered.

I should like to express my thanks to Prof. Noah Morris and to Dr. W. Martin for their help and to the Medical Research Council for a grant towards expenses.

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Reviews of Books

Diseases Affecting the Vulva

By ELIZABETH HUNT, M.D. Lpool, hon. physician to the skin department of the South London Hospital for Women. London: Henry Kimpton. Pp. 215. 21*s*.

THIS book is written by a dermatologist for gynæcologists and general practitioners who are called on to treat the numerous affections of the vulva. When one recalls the empirical and haphazard way in which most vulval affections are dismissed in outpatient departments with a douche or calamine lotion it is clear that Dr. Hunt is tackling a genuine problem in this concise and readable book well fortified with illustrations. The histopathology of each lesion is carefully examined and there are many microphotographs, all of which are understandable even to the inexpert histologist. Treatment follows sound conservative lines, but it is up to date and based on scientific principles. Each chapter is a self-contained unit, and though the book is a small one it completely covers every rare and common skin lesion found in the region of the vulva.

Diseases of Infancy and Childhood

(3rd ed.) By WILFRID SHELDON, M.D. Lond., F.R.C.P. London: J. and A. Churchill. Pp. 756. 24*s*.

Dr. Sheldon's teaching is based on practice, but he has included accounts of rare conditions without making the volume unwieldly. This edition has been thoroughly revised and a few omissions have been repaired. As in all recent books on medicine there are many new

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references to sulphanilamide and sulphapyridine, but Dr. Sheldon has taken a critical attitude to these drugs, and does not look upon them as a panacea. The appendix on their administration is useful but gives scanty information about intramuscular and intravenous injection. Another new appendix is a useful guide to the myriad of vitamin preparations.

Annual Review of Biochemistry

Vol. IX. Edited by J. M. LUCK and J. H. C. SMITH, Stanford University, California. California: Annual Reviews Inc. Pp. 744. 27*s*. 6*d*.

THE publication of the Annual Review of Physiology has had the effect of confining the reviews in this volume more strictly to biochemistry, which lessens the appeal of the book to the general medical reader, an appeal which in any case was slight since few general readers could be expected to plunge into the midstream of current biochemical progress. To the biochemist the volume is most useful, but it would be an advantage if the authors would arrange their references in a standard form. At present some bibliographies are given in alphabetical order and others in the order in which references appear in the text, which is less satisfactory. The form of the book deserves consideration; specialist workers are unlikely to be interested in more than a few of the many articles, and few research workers in this country can afford the purchase price for the sake of one or two articles. The *Revue annuelle de physiologie* set an example by publishing its reviews separately and cheaply in paper bindings. The complete bound volume could still be available for libraries and anyone else who wanted it. An enterprise in scientific publishing on these lines might meet with a surprisingly large response. The preface to the book, written in California in the early days of April, deplores the fact that it is almost impossible to write calmly and with a sense of detachment. Prof. Samson Wright has already remarked that while English scientists are getting used to the cold water the Americans are still standing on the edge shivering. Apart from this aspect, the war has had more serious repercussions in that for the first time there are no contributions from Germany. Have biochemists in that country ceased to do work of international importance? If not it is surely up to America to make their findings known. A review on muscle by Prof. Parnas of Lwow which should have appeared was not received. There are, in fact, only ten contributions from outside America—six from Britain and four from Scandinavia.

Hæmophilia and Egg-White Derivatives

Coagulant, Anti-Coagulant and Bactericidal Effects. By W. A. TIMPERLEY, M.B., M.Sc. Sheff. Leeds: Printed for the author by Jowett and Sowry. Pp. 63.

SINCE Dr. Timperley published with Professors A. E. Naish and G. A. Clark (*Lancet*, 1936, **2**, 1142) his claim to reduce the clotting-time of blood with derivatives of egg-white other workers in this country and in America have tried without success to reproduce his results. On the other hand Dam's researches on the coagulating defect in jaundice have not only been confirmed, but have been widened in application and have led to the synthesis of pure vitamin K. In this little monograph Dr. Timperley summarises his researches. Hæmophilia is a long and crippling disease, in which the patient may well acquire faith in a physician who treats him with enthusiasm and inspires him with hope, but this record of crises overridden will leave most readers unpersuaded that the treatment has specific value.

Anatomy of the Female Pelvis

(3rd ed.) By F. A. MAGUIRE, M.D. Sydney, F.R.C.S., F.R.C.O.G. London: Angus and Robertson. Pp. 162. 10*s*. 6*d*.

THE good name of this little book is simply explained. It is written by a surgeon and an anatomist who uses first principles, simple language and exceptionally well-drawn diagrams to unravel the pons asinorum of all students starting the study of gynæcology and obstetrics. The book is based on the dissection and serial section of 16 female pelves. It should be kept by the teacher for reference, and should be read by all students about to embark on their six months' gynæcological and obstetric clerkship. It could also be used with profit by the second-year student dissecting the female pelvis. If before making his first vaginal examination the student reads the last chapter on physical examination he will find himself missing very little clinical detail. Those facing their final examination should spend a quiet half hour rereading the chapters on the pelvic muscles and fascia, the pelvic connective tissue and the supports of the uterus.

Forensic Chemistry

By HENRY T. F. RHODES, Dip. Inst. C. (Lyon), hon. research assistant, Conan Doyle Laboratory of Chemical Research, Technical Police, Prefecture of the Rhône, France. London: Chapman and Hall. Pp. 214. 12*s*. 6*d*.

IN this elementary little book the author has collected the details of forensic analysis in a manner that is not without attractions, although to a limited public owing to the author's particular interests in the detection of crime. Fully three-quarters of the book is taken up with the identification of prints, dusts, metals, ashes, stains, firearm powders, questioned documents and counterfeit money, the remainder dealing with the analysis for poisons. In the former Rhodes shows an unusual grip of the subject which enables him to present it lucidly. Extensive indexes, both subject and author, add value to what is a pleasing and helpful laboratory detective handbook.

Histological Technic

Including a Discussion of Botanical Microtechnic. By ABRAM A. KRAJIAN, department of pathology, Los Angeles County Hospital. London: Henry Kimpton. Pp. 272. 18*s*.

THE methods described in this book cover the investigation of normal and pathological material, with the exception of the pituitary and pineal glands. The author gives a detailed exposition of the preparation and staining of frozen sections; preparations of the kind can be quickly and inexpensively made and those who wish to use them will find many helpful suggestions here. Modifications of known methods suggested by the author invite trial, since he is clearly an enthusiastic technician. The reproduction of the microphotographs is good except for those in colour, which probably do insufficient justice to the original preparations. An unusual feature is the 28-page section on botanical methods by Dr. E. D. Woodhouse; this may be helpful to pathologists who wish to extend their observations to the plant kingdom.

Elementary Pathological Histology

(2nd ed.) By W. G. BARNARD. London: H. K. Lewis and Co. Pp. 70. 10*s*.

THE war-time student who does not find his instruction too easy to come by should cordially welcome the second edition of Prof. Barnard's book. First published in 1928, the book was originally intended for use on the bench when sections were being examined, and the author has been content that it should so remain—a description of the common things of morbid histology without theories and without padding. Each chapter consists of a short description of the pathological process under review, together with a series of excellent black and white photomicrographs. Prof. Barnard urges the student not to be content with looking down a microscope and "spotting" what a section is, but to try and resolve the section into the various cells and particles and substances of which it is compounded. As he says, there is nothing inherently indelicate in a curiosity which brings an oil-immersion lens to bear on a tumour or an inflammation. It is only by minute examination that we can expect to be in a position to explain the series of events which have taken place and to assess the effect of the changes of function. The book is essentially concerned with the general principles of morbid histology, such as infection, inflammation, regeneration, necrosis, and so on. Regional pathology therefore takes its place as a study of the general morbid process applied to a particular organ. The student who expects to have his knowledge potted and labelled ready for him to assimilate will find the time and trouble spent on these general principles well repaid. Prof. Barnard is a wise guide who does not confound knowledge with words. The illustrations, especially the colour plates, deserve high praise.

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THE LANCET

LONDON: SATURDAY, OCTOBER 12, 1940

DOCTORS IN NEED

WE are only at the end of the first year of the war and there is already economic distress among members of our profession which needs instant attention. It was at about the same period in the last war that an appeal was made which took a rather different form. The appeal was then rather to those who remained in civil practice to take a sort of monastic vow not to live more luxuriously than those who went to the front. There is little need now to curb luxury, for in common with other citizens we are rationed for our essentials and have no time for accessories, and the situation is profoundly altered by the fact that the battle front now covers the whole country. The extent of financial distress can as yet hardly be estimated. We know that a few practitioners in London have been killed at their work and our obituary columns contain week by week the names of some who have been cut off at the outset of their career. Whatever the needs of their dependants it is for the profession as a whole to make sure that there is no distress. Others of our members have lost property, while some have been evacuated at short notice from the towns where they normally practise. Numerically the need cannot be overwhelming, and in time the unemployment resulting from the movement of population should adjust itself. Many retired men have in fact come back into practice. While, therefore, in the majority of cases nothing more may be needed than some assistance in the form of a loan repayable on very easy terms when the recipient has been able to re-establish himself there must be others where a young practitioner has been cut off before he had time to make provision for the future; in such cases the education of his children should be a charge on his professional colleagues. Our profession has always responded generously to special appeals, though it has been less sensitive to the prolonged need made evident in the work of the R.M.B.F. That body has undertaken to distribute the monies received in the light of long experience in helpful and tactful work. We publish on another page a complete list of subscriptions to the relief fund up to Monday last totalling some £4400 and we commend the fund to the hearts and pockets of our readers according to their capacity.

INFECTION IN THE SHELTER

THE Government is at last tackling the public-health aspects of air-raid shelters seriously. A committee with Lord HORDER as chairman has made its recommendations with commendable promptitude after a four-day (and night) tour of the London shelters, and these are to be implemented by an interdepartmental committee of the Ministries of Health and Home Security. Admiral Sir EDWARD EVANS has been appointed to give his full time to shelter administration, and the Horder committee remains in session. This is good news, for many shelters—tube stations, basement, Anderson, surface or underground—hold the ingredients necessary for the epidemic spread of infection. The communal shelters were originally intended for the protection of people caught in the streets by daylight raids, but with the night bombing of London a new problem arose. The surface shelters became unpopular and there was a wholesale flocking to the deep shelters and the tubes, which could offer freedom from noise, fellowship, light and (sometimes) room to lie down. The shelter became a dormitory instead of a temporary refuge. To the most popular people came from long distances, bringing their bedding, and friends found places for old people, the bedridden and infirm while the queues waited outside. Gross overcrowding has resulted, and the lack of sanitation and sanitary supervision, of heating and ventilation, coupled with lack of sleep, nervous strain and improvised meals, has brought the danger of typhoid and dysentery, and, more menacing still, the respiratory infections.

The first essentials are some regulation of those who use the public shelters at night, proper sanitary arrangements, bunks to sleep in, heating, and health supervision of the regular habitués. Many people use the communal shelters when they could provide themselves with adequate protection at home. A reissue of the excellent pamphlet "Your Home as an Air-raid Shelter," incorporating fresh ideas like using the dining-room table as a house-kennel, supplemented perhaps by visits from the A.R.P. staff to give advice and guidance, would encourage many folks to sleep in the comparative peace and comfort of their own warm, dry homes. The dispersal of women and children and of the old and infirm to billets in the country will also help to relieve congestion. Above all, shelters must be regularly inspected by the M.O.H.

What further provisions can be made to minimise respiratory infections during the coming winter? Can we on the one side raise the resistance of the individual and on the other take measures against respiratory cross-infection? The first need is for an adequate, well-balanced and protective diet. Fortunately the Minister of Food is alive to this, and while no vitamin can lay claim to being specifically anti-infective the addition of vitamins A and D to margarine and of B_1 to bread are wise precautions, though C has yet to be taken care of. As a nation we do not eat enough fresh fruit and vegetables, and a supply of synthetic vitamin C might well be made available for those who cannot afford to buy it. There is no evidence that any process of "hardening" by physical exercises, cold baths and the like protects against infection. But chilling and sudden falls in the mean temperature do have an association with colds which in turn may lead to bronchitis or pneumonia, so that the shelters must be warmed and their inhabitants should provide themselves with warm night-attire. If the proportion of children in the shelters is small the principal respiratory infections to be guarded against are colds, influenza, pulmonary tuberculosis and cerebrospinal fever. The infectivity of the first two, the virus diseases, is high, of the others low, but all may be spread by direct contact through droplets ejected while coughing, sneezing or speaking, and most may also be spread under suitable conditions by infective particles carried in air-currents. Direct droplet infection can probably be prevented only by some system of masking, and no doubt an effective mask could be designed which would be cheap and comfortable enough to be accepted as the recognised shelter wear.

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The factors which contribute to bacterial pollution of the air are overcrowding, poor ventilation and a dusty atmosphere, and where these are present the risk of air-borne, as opposed to direct droplet, infection will be greatest with diseases of high infectivity like influenza. Artificial ventilation is expensive and not always welcomed when it is installed, but it is having the attention of the authorities. Dust can largely be suppressed by frequent vacuum-cleaning and the application of crude liquid paraffin to the floor once a week.[1] What is wanted now is an effective system of aerial disinfection, and the possibility of using aerosols at once suggests itself. The germicidal aerosol [2] is an antiseptic mixture dissolved in glycerin or similar solvent and forcibly sprayed into the air by a machine which atomises the liquid to extremely small particles. Its effective concentration is amazingly low (1 volume of the liquid to 10–500 million volumes of air) and its bactericidal action is presumably by collision and adsorption between aerosol and bacteria in the air. Particulate matter such as dust interferes with the effect of the aerosol. Further, it must be understood that aerosols cannot prevent the direct spread of infection by droplets. Only a few antiseptics have so far been found to be effective and safe aerosols—among them resorcinol,[2] hexyl-resorcinol [3] and sodium hypochlorite. The last of these is the cheapest, but it is unstable and highly corrosive to metal containers and has other disadvantages.[4] If aerosols become popular difficulties may be experienced in the supply of atomising machines, which will require improvements and adaptations for use in shelters. Moreover, few field tests have so far been performed with aerosols outside the ferret-house. The communal shelters provide an opportunity for controlled tests.

SILICOSIS REVIEWED

IT is widely thought that silicosis can be produced at will in experimental animals by placing silica dust in their lungs, thus causing them to develop lesions supposedly identical with those found in man. BELT, FERRIS and KING,[5] in a study of the nature of the silicotic nodule, human and experimental, have found what they believe to be distinctive features distinguishing one lesion from the other. The human silicotic nodule is a well-defined pathological entity whose morphology, often described, is essentially constant. Cases derived from many occupations the world over show the same chronic lesions, composed of inert hyalinised fibrous material without evidence of cellular activity except perhaps at the surface. The fibres tend to be concentrically arranged and the outer ones are woven into a heavy collagenous capsule. BELT and his colleagues think that their rat lesions are the same as those produced by other experimentalists, but believe the similarity between the human and animal nodules to be only superficial. The fibres of the animal nodule, they find, are finer, more like reticulum than collagen, looser, less hyalinised, less contracted and less gnarled with age, and they seem to form a network rather than a concentric pattern. The nodule, indeed, is a tangle of fibres and does not develop the "ball of twine" appearance so often referred to in descriptions of the human nodule. The conviction that these differences in appearance are real differences of structure is strengthened by a study of sections which have been submitted to micro-incineration. With dark-field illumination they observed an outer halo of dust enclosing a clear zone containing little or no silica; the clear zone represented the capsule and was a distinctive and almost constant feature of the human lesion. This "zone of redundant fibrosis" is absent from the animal lesions, and may not only be a distinctive structural difference but may conceivably point to some difference in ætiology. They think it possible that the human silicotic nodule is not due entirely to the silica but to some additional factor, possibly infective, acting with it. This conclusion is reminiscent of that of E. H. KETTLE.

KING and BELT [6] have made an analytical study of the silica content of silicotic and non-silicotic tissues. Tissue which contains silicotic nodules invariably shows an excess of silica, but the converse is not always the case. In the lungs of persons dying in several dusty occupations concentrations of silica greatly in excess of the normal were found, often being greater than those in lungs having well-developed silicotic nodulation. The lymph-nodes of normal people dying of old age may also have extremely high contents of silica; the cases in this group had no history of exposure to dusty atmospheres, and the silica deposits must have been derived from the inhaled dust of house and street and transported from the lungs to the lymph tissue, where they had remained, presumably, for many years causing no response beyond the production of a loose network of fibres entangling the particles. This evidence suggests that we need a fuller knowledge of the nature of the dust deposits than is furnished by a chemical analysis for "total silica." Silica occurs in nature in several forms and the inhalation of the dust of some of these—quartz, for example—may be productive of silicosis, whereas the inhalation of others may be relatively harmless. Some additional factor essential to the development of silicosis may possibly be absent from the tissues of the non-silicotic cases.

The pneumonoconiosis of the South Wales coal-field, which has for several years been recognised as a form of silicosis, differs from the classical silicosis of the goldminer. The close relationship between silicosis and tuberculosis, long held to be one of the most characteristic features of the disease, is absent, and the histological appearances of the lesions in the lung are not always characteristic; the nodule may be less densely fibrous and the concentric arrangement of the fibres less marked. New ground has now been explored by GOUGH [7] among coal-trimmers. These men work on the docks and in the holds of ships in an atmosphere which is thick with coal dust. This dust, however, contains a much smaller proportion of siliceous material than that of coalmines, where operations take place in the accompanying rock strata as well as in the coal seams. Coal dust has been thought not to produce serious fibrosis of the lungs, but COLLIS and GILCHRIST [8] have noted that coal-

1. Van den Ende, M., Lush, D. and Edward, D. A. ff. *Lancet*, Aug. 3, 1940, p. 133.
2. See Pulvertaft, R. J. V., Lemon, G. C. and Walker, J. W. *Lancet*, 1939, **1**, 443; also *Lancet*, July 6, 1940, p. 14.
3. Twort, C. C., Baker, A. H., Finn, S. R. and Powell, E. O. *J. Hyg. Camb.* May, 1940, p. 253.
4. Baker, A. H., Finn, S. R., Twort, C. C. *Ibid*, Sept. 1940, p. 560.
5. Belt, T. H., Ferris, A. A. and King, E. J. *J. Path. Bact.* September, 1940, p. 263.
6. King and Belt, *Ibid*, p. 269.
7. Gough, J. *Ibid*, p. 277.
8. Collis, E. L. and Gilchrist, J. C. *J. industr. Hyg.* 1938, **10**, 101.

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trimmers not infrequently showed clinical and radiographic evidences of silicosis, and GOUGH considers pneumonoconiosis to have been the main cause of death in the 12 cases he studied. On clinical, radiological, morbid anatomical and histological grounds he maintains that the condition found in these cases is a modified silicosis indistinguishable from that observed in the coalminers. The ætiology of this condition needs further investigation. Is the fibrosis observed due to coal dust itself or to the small amount of siliceous material contained in the coal? Or are two processes at work—one due to coal and the other to silica—each process modifying the other to produce the atypical silicosis found in South Wales?

THE TEACHING OF PUBLIC HEALTH

STUDENTS should no doubt be taught something of drains, dairies, drinking water and the dust of dried dejecta, but it matters most that for them public health should be linked to clinical medicine and to a wide range of social and economic questions. Only then will public health cease to be a dull impersonal subject and only then will the young doctor realise that his patients are not just medical cases per se but individuals reacting to a complex environment. Two major problems now face preventive medicine—one, the promotion of healthy living which implies the prevention of disease, the other the prevention of incapacity from disease. For working capacity is important not merely as an aspect of national health but as a factor influencing profoundly the health and happiness of the individual. The practitioner must know about methods of preventing disease in order that these may inspire his work—the practice of personal hygiene, application of modern knowledge of nutrition, immunisation against communicable disease, and the like. He must also know how to secure and maintain maximal efficiency in the person whose health is already so damaged that breakdown is certain unless steps are taken to prevent it. Recent advances in medicine have opened up great possibilities, as in the dietetic care and aftercare of patients suffering from alimentary disorders and the nutritional anæmias, in the maintenance therapy of such conditions as diabetes and pernicious anæmia, and in the treatment of a large variety of physical and mental conditions calling for systematic rehabilitative effort, a group bound to assume more compelling importance in the immediate future. Before the war Denmark had elaborated a system of invalidity insurance that provided a wide range of constructive aids to working capacity.[1] There is in fact great need for the development in this country of work along these lines, work in which the universities and teaching schools should take a leading part, linking their departments of public health more closely with clinical medicine on the one hand and with social agencies on the other. There is a vast field for research into the less obtrusive effects of work on health and the assessment of industrial welfare activity; for a significant number of years, for instance, the Miners Welfare Committee has been conducting a major experiment in social science. Let us make sure that the professors of public health in our leading universities are demonstrating to their students that public health is a vital thing and are creating an interest in constructive medicine that will fit them to play their rightful part in shaping health services. Public-health research and teaching must not be bounded by present concepts of local health administration.

1. See *Lancet*, 1940, 1, 706.

TETANUS IMMUNISATION ON THE HOME FRONT

IT is perhaps too early to assess the practical effects of the large-scale active immunisation of the Army and the Air Force against tetanus, although Maj.-General H. MARRIAN PERRY has already given some encouraging figures from the Army.[1] He points out that while it is the policy in the Army to give the wounded soldier a dose of tetanus antitoxin whether he has been actively immunised or not the circumstances of the recent campaign in France and Flanders made it impossible to give prophylactic antitoxin to a majority of the wounded; yet the incidence of tetanus was only 0·45 per 1000 which may be contrasted with a rate of 8 per 1000 for the comparable conditions during the first three months of the 1914–18 war. He adds that such cases of tetanus as have been noted have occurred in men who were not actively immunised. That being the case and with the war now being waged on the home front, it becomes an obvious duty to extend active immunisation to as many as possible of those who are, or are likely to be, in the "front line" at home. Among them we think especially just now of the ambulance units, the fire brigades and the A.R.P. demolition squads who have been carrying on so magnificently their rescue work in our bombed towns and cities. The responsibility for their protection rests with hospital and public-health authorities, and already a certain amount of active immunisation has been done amongst them. Another large body of men who may at any time be in the front line is the Home Guard, and after setting such a fine example for the regular army the War Office might well take in hand the immunisation of our country's second line of defence. Active immunisation against tetanus is painless and has many other advantages over passive protection,[2] but it requires an interval of six weeks between the first and second doses, so there is no time to waste in getting the personnel of our home defences immunised.

WAR PRIMER ON WOUND INFECTION

THE series of articles which appeared in our columns earlier in the year have been made the basis of the Primer on Wound Infection edited by Mr. W. H. Ogilvie, F.R.C.S., which is published this week. The primer aims at stating the problems of infection which everyone engaged on the treatment of casualties, whether military or civilian, has to face, and at giving a simple account of the measures they can take to solve them. The six articles—The Problems by Mr. Ogilvie, Biological Aspects by Colonel L. E. H. Whitby, Bacteriology by Dr. Robert Cruickshank, Antiseptics by Prof. L. P. Garrod, Chemotherapy by Major G. A. H. Buttle and Surgical Principles by Mr. Ogilvie—have been revised by their authors, and to these have been added a section on surgical procedure, including plaster technique, by Mr. Ogilvie, three appendices, on antisera, sulphonamides and the treatment of burns, and an index. The primer costs half a crown (2*s.* 9*d.* post free) and can be had from THE LANCET Office, 7, Adam Street, Adelphi, W.C.2.

1. *Brit. med. J.* Sept. 14, 1940, p. 364.
2. See *Lancet*, 1940, 1, 1088.

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Annotations

MEDICINES AND THE PURCHASE TAX

THE section of the Finance Act which creates the purchase tax was to have become operative on Oct. 1, but the date has been postponed to Oct. 21, thus giving an extra three weeks to traders and the customs and excise authorities to complete their preparations for this massive innovation. In general drugs will be subject to the lower rate of duty of 16⅔% of their wholesale price, but "essential drugs of an exceptionally costly character" will be exempted from the tax. The official interpretation of "essential and costly" drugs is a conservative one: it is at present limited to the following items:

Arsphenamine and its derivatives, bromethol, chloroform (anæsthetic), cocaine and salts of cocaine, desoxycorticosterone acetate, ether (anæsthetic), ethyl chloride, hexobarbitone, insulin, liver extract and active principles of liver, hormones, natural or synthetic and preparations thereof, including liver extracts and active principles of liver, and insulin and its compounds with protamine and zinc; oxygen, pituitary extract, procaine and salts of procaine, sulphanilamide and its derivatives, suprarenal cortex extract, sera, vaccines.

In presenting this list the treasury intimated that it was prepared to consider representations from responsible quarters concerning its extension, and discussions are now proceeding between various parties and the Board of Customs and Excise with regard to additions to the list. The Pharmaceutical Society, in particular, has offered its assistance to the authorities in compiling a rational list of drugs for exemption. In order to avoid misunderstanding it will be well to have a list of exempted drugs in which each item is set out under its proper name and every vegetable raw material used in the preparation of medicines should be specified in such a way that there can be no future argument over terminology. Failing specific tabulation it might be laid down that substances which are the subjects of monographs in the British Pharmacopœia and the British Pharmaceutical Codex should be exempted from the tax when purchased bona fide for use as medicines or for the manufacture of medicines or antiseptics.

THE LYMPHOCYTE

OF all body cells the familiar lymphocyte remains one of the most mysterious, though various rôles have been assigned to it. For most of the suggestions there is some experimental support, but some of them fly in the face of common sense. Thus experiments which tend to show that lymphocytes packed into lymph-glands act as a filter and death-trap for bacteria are supported by clinical knowledge, but when it is claimed that the lymphocyte is a form of defence against tumour cells one can only wonder why the latter grow so well as metastases in lymph-nodes. Professor Florey and his collaborators in Oxford[1] have attempted by isolating the lymphocyte as a single cell to determine its characters and functions. This has required an advance in technique which is now most elaborate. By means of ingenious adaptations of the Sandison-Clark transparent chamber in the rabbit's ear[2] they have found that lymphocytes are more agile than they are commonly supposed to be. Nothing short of constant observation is sufficient to keep a given lymphocyte in view for long periods. For this reason and because rabbits cannot even under anæsthesia be kept still indefinitely the complete life history in the chamber has not yet been followed. Lymphocytes move in straight lines and small circles quite as actively as many polymorphs. They prefer warmth and are probably sensitive to oxygen-lack. During the period of observation none were seen to undergo transformation into any other type of cell—though conditions favouring chronic inflammation existed no lymphocytes were found changing into fibrocytes. Thus no support was given to the view of which Maximow was the best known exponent, that lymphocytes have various developmental capacities. Nor were any signs of phagocytosis seen, although tempting particles of carbon were offered. These negative findings are supported by Medawar,[3] who tried to transform lymphocytes into granular leucocytes in tissue culture after the method of Bloom. The most strikingly successful experiment on this subject was that in which Lang[4] transformed the whole germinal centre of lymph follicles into granular leucocytes by repeated intravenous injections of dead bacilli. This would be an easy experiment to repeat on isolated lymphocytes with the transparent chamber technique, but for the time being war has brought this work to an end.

ELECTRICAL CHANGES IN CEREBRAL DAMAGE

THE use of the electroencephalograph is becoming more general in the clinical study of intracranial abnormalities. At first the minute alternations in electrical potential caused by the metabolism of cerebral cells were the affair of the electro-physiologist, but in the last few years electrical changes caused by disease of these cells have been put to practical use. Normally cortical cells, particularly those of the parieto-occipital cortex, show a rhythmic change in electrical potential with a frequency of 8–12 a second. These changes can be amplified electrically, and recorded mechanically. Associated with the well-marked frequencies of about 10 a second are many underlying waves of lower voltage and varying rate. Some, seen particularly in the parietal lobes, occur about 20 times a second, while others have a duration of two to three seconds. These slow waves are normally absent or of so low voltage as to be insignificant, but in any condition affecting the normal behaviour of cerebral cells their size increases and they may submerge the faster waves and convert the normal electroencephalogram, with its rhythmic spindles of 10 a second waves, into an undulating series of slow oscillations, ranging from slow rollers lasting for two seconds to the more usual "delta" waves of 2–5 a second. These abnormal slow waves are seen around areas of cortical damage, and can be used to locate such diverse lesions as tumours, abscesses, and hæmatomas.[5] They have been employed for the last two or three years in the routine investigation of cerebral lesions and their value as an ancillary diagnostic aid has become established.[6] Although they arise in damaged cortex they can be produced experimentally and are reversible.[7]

Now Jasper, Kershman and Elvidge[8] have applied these slow waves to the diagnosis and management of cerebral injuries. They have investigated 37 patients with acute head injuries, and 23 with the late effects of such injuries. They confirm the earlier reports that cerebral damage is associated with slow waves and conclude that the amount of type of slow activity are the best single measure of the severity of cortical damage. In their most severe cases the electroencephalograms were composed entirely of abnormal slow waves with no trace of the normal rhythm. Although improvement in the clinical state and in the electrical record were concomitant, abnormal waves persisted after symptoms had disappeared, and the authors suggest that highly integrated psychological testing might lay bare abnormalities in behaviour and mood due to the residual damage repre-

1. Ebert, R. H., Sanders, A. G. and Florey, H. W. *Brit. J. exp. Path.* August, 1940, p. 212.
2. See *Lancet*, 1939, **2**, 939.
3. Medawar, J. *Brit. J. exp. Path.* August, 1940, p. 205.
4. Lang, F. *Z. mikr.-anat. Forsch.* 1926, **4**, 417.
5. Walter, W. G. *J. Neurol. Psychiat.* 1938, **1**, 359.
6. Williams, D. J. and Gibbs, F. A. *Arch. Neurol. Psychiat.* 1939, **41**, 519.
7. Williams, *Brain*, 1939, **62**, 321.
8. Jasper, H. H., Kershman, J. and Elvidge, A. *Arch. Neurol. Psychiat.* August, 1940, p. 328.

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sented by the delta waves. On the other hand some cases without signs of organic damage who had psychoneurotic symptoms showed no abnormality. Jasper and his colleagues claim that the method may thus be used in the differentiation of purely psychological changes from the physical sequelæ of trauma, and that by using a special technique the nature of the lesion may sometimes be hazarded. Similar observations are being made on material which the war has made available in this country, and it will be interesting if these conclusions are substantiated. Even if the method is not found infallible it has already shown itself a useful adjunct to accurate clinical observation, and as knowledge increases it will gradually come into more general use.

CHEMISTRY AND MEDICINE

"Whirr! Whirr! All by wheels! Whiz! Whiz! All by steam!" Thus exclaimed the pasha transported with delight by Kinglake's references to the inventive genius of the western world. After the lapse of a mere century we find that the wheels and the steam which excited the imagination of a previous generation have been succeeded by a quiet reverence for the mysteries of natural science. The cultured laity, modern counterpart of the pasha, have for some years been under the spell of the Eddingtons, the Jeanses and the Huxleys who live in the cold pure light of fundamental knowledge. How satisfying it is to explain the characteristic curvature of the blade of grass in terms of plant hormones! The crowning glory of a sunset is now reduced to a consideration of the spectrum and dust particles. Even in the nursery the merits of heavy water are discussed now that the doctrine of free will is démodé. On one thing all are agreed—that where there is no chemistry the people perish. There could be no more eloquent testimony to the value of chemistry than the volume of papers[1] presented at the fiftieth anniversary of the founding of the medical school of the University of Minnesota. Under the editorship of Prof. Maurice B. Visscher reviews are published on physical chemistry in medicine, investigations in metabolism, aspects of immunity and chemotherapy, and the nervous control of the organism. The writers are men who have earned recognition as researchers, and they present their own work in proper perspective against a background of selected literature. Dr. Johnson said that the only book that ever took him out of bed two hours sooner than he wished to rise was Burton's Anatomy of Melancholy; this is another such book. It will make an instant appeal to clinical scientists who have a bias towards physiological chemistry, but the neurologist and the bacteriologist will also find here a number of fascinating papers. To take one of the many, Prof. H. F. Helmholtz, writing on chemistry in urinary antisepsis briefly surveys the progress which has been made since Bokai in 1878 first tried to eradicate urinary infections by altering the reaction of the urine, and he leads the reader step by step from the acidifiers and alkalinisers to hexamine, which still stands out clearly as a landmark in the science of urology. He drops a few pithy remarks about salol, acriflavine and Pyridium and comments in more detail on the ketogenic diet and mandelic acid. These resemble hexamine in requiring a pH of about 5·5 for their actions to develop. Any of them may fail for two reasons: impaired renal function may prevent the excretion either of the antiseptic in sufficiently high concentration or of a urine of sufficiently low pH; and failure may also be due to the presence of infecting organisms which produce an alkalinity of the urine despite the administration of acid and acid-forming salts. Helmholtz points out that an organic acid which in the same concentrations would give a bactericidal urine at a higher pH would be valuable. Remarking that sulphanilamide fits into "the weakest spot of our armamentarium in the treatment of infection of the urinary tract" he goes on to remind us of J. R. Sickler's important discovery that some strains of bacteria are killed readily by low concentrations of sulphanilamide and that other strains are resistant to much higher concentrations.

1. Chemistry and Medicine. Minneapolis: University of Minnesota Press. Pp. 296. 28s.

EAR PLUGS

THE Ministry of Health has decided to issue ear plugs to the armed forces and the civilian population. Civilians will receive them, as they received their gas-masks, from the local A.R.P. wardens who are supplied by the A.R.P. department of the local authority. It is understood that the plug is to be similar to the Mallock-Armstrong device. The official description is as follows: "The plug consists of a hollow tapered rubber plug with a rim at one end to which a piece of string can be fastened. When worn the plugs do not seriously interfere with the hearing of ordinary speech, &c., but they reduce the crash and concussion of explosives. Their object is not so much to obviate physical damage to the ear as to prevent the shattering effect of noise on the nerves. The plug should be slightly moistened before being inserted in the ear . . ."; then follow precise instructions for doing this and for clean storage. If the plug does not fit it is to be whittled to shape with a razor blade or scissors. The first issue is free, and replacement will cost twopence a pair. The chief differences from the Mallock-Armstrong plug are the material (rubber instead of vulcanite), the shape (a truncated cone instead of a Halma man), uniformity of size, and the absence of a gauze net and filter at the outer end. These differences may have been made to avoid infringements of patent rights or may be simplifications for ease of mass production. The first three are probably of little practical significance, but the gauze net and filter are claimed to be an important part of the Mallock-Armstrong plug because they prevent any alterations of air pressure passing through to the drum. The Ministry clearly state, however, in their official description that they are not attempting to protect the population against physical damage to the ear. Whether they are quite justified in thus disclaiming responsibility is questionable, at any rate on medical grounds. The proprietary plug was successful in the last war and has since been used in industry. If the gauze net and filter really do give the necessary protection (and experiment would prove this easily enough) it is difficult to understand why they have not been incorporated in the official plugs. Difficulties of manufacture could doubtless be overcome. Perhaps it is not too late for the Ministry's experts to give this point further consideration.

VIRULENCE OF THE DIPHTHERIA BACILLUS

MANY of the patients admitted to isolation hospitals as diphtheria have atypical clinical conditions including suspected nasal and aural diphtheria; in a proportion there are no clinical signs of infection. It is therefore important to establish the toxigenicity of organisms morphologically resembling *Corynebacterium diphtheriæ* which may be isolated from the throat, nose or ear of such cases. In the past virulence-testing was usually the final stage in a process which began with the discovery of a diphtheria-like bacillus on a Loeffler slope; the culture was plated on a tellurite-containing medium, colonies were picked on to serum-agar from which subcultures were made in Hiss's serum-water containing glucose and saccharose, and if glucose but not saccharose was fermented a saline suspension of the organism was inoculated subcutaneously into the axilla of a guineapig; death of the animal within three days with pleural effusion and congested or hæmorrhagic suprarenals was evidence of a toxigenic strain. The whole procedure was

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time-consuming and not uniformly reliable. In recent years the use of the intradermal virulence test and the recognition of three main biological types of the diphtheria bacillus, which can often be recognised by their colonial appearance on blood- or serum-tellurite-agar, have considerably quickened and simplified the division of *C. diphtheriæ* into virulent and non-virulent forms. Mair[1] has shown in the examination of several thousand strains that almost all starch-fermenting and "barred" or intermediate forms are toxigenic, so that if swabs are plated directly on a blood-tellurite medium like that of Neill,[2] and if atypical colonies are further tested for their fermentation reactions, a large proportion of strains can be reported as virulent in 2–3 days' time. There remains the mitis group, and since some 10% of these are non-virulent all should be tested for virulence. Mair's[3] intradermal technique is as follows: 0·2 c.cm. of a freshly prepared saline suspension containing approximately 500 million organisms per c.cm. are injected into the skin of a guineapig weighing 300–400 g. and immediately afterwards 1 unit of antitoxin per 50 g. body-weight is given. This can be read in 1–2 days and the results are reliable. Alternatively, a 24-hours' broth culture can be used although with it the lesions are more diffuse. With the subcutaneous method and a small inoculum anomalous results have been obtained for which Holt and Wright[4] have lately suggested an explanation. They have found that normal saline has a bactericidal action on the diphtheria bacillus as it was already known to have on the pneumococcus, meningococcus and hæmolytic streptococcus, and for the subcutaneous virulence test they suggest injection of the whole of a good-sized Loeffler-slope culture suspended in 3 c.cm. of broth. As they point out, saline has often been used as a diluent in virulence tests and for assessing the effects of antiseptics and chemotherapeutic drugs without much consideration of its effects. Alternative and harmless bacterial diluents are 0·1% gelatin, serum and peptone, the value of which may depend on the nutriment they provide; but for the maintenance of a physiologically normal bacterial population Holt and Wright think that salt-balance, including phosphates and calcium, may be important. They have rendered a service both to the bacteriologist and the clinician in showing that the subcutaneous virulence test for *C. diphtheriæ* can be relied on if the inoculum is large and suitably suspended.

THE MOTOR CORTEX

IT has long been asserted in standard textbooks of anatomy that the body is represented in the precentral gyrus as if it were standing on its head with the face at the bottom of the gyrus and the feet at the top. Dr. John E. Scarff's observations,[5] based on fourteen epileptics, demonstrate that there has been an upward displacement of the centres which make up the area, with the result that those which control the lower limb have been pushed over the upper border on to the medial surface, together with those for the perineal region. In thirteen of Dr. Scarff's subjects the proof was negative; that is, he elicited arm movements but never leg movements from stimulation over a wide area of the lateral aspect extending up to the medial border. The presence of the great longitudinal sinus and its tributary veins, and of pacchionian bodies, makes the approach to the medial aspect difficult and dangerous, but in one patient he was able to overcome these difficulties, and by stimulation to produce positive responses in the lower limb. Focal contraction of the rectal sphincter was also obtained repeatedly by stimulation of the surface in the neighbourhood of the gyrus cinguli. These observations are in accord with those of Penfield and Boldrey in their classic paper[6] to which Dr. Scarff has done rather less than justice. In studies of 163 patients they showed conclusively that the upper-limb area extends to the medial border of the hemisphere. They found that the lower limb and trunk responded only rarely to stimulation of the lateral aspect and concluded that "more responses would have been obtained had it been feasible to stimulate the edge of the hemisphere and the mesial surface in the median longitudinal fissure more frequently." The danger of bleeding made this procedure inadvisable unless clearly necessary. Nevertheless, they were able in some cases to expose this surface and demonstrate leg movements. Their findings differ from those of Scarff in that they did obtain, though rarely, some positive lower-limb responses from the upper part of the lateral aspect. There is in fact a considerable overlap of areas in the precentral gyrus, and voluntary muscles respond also, though less often, to stimulation of similar levels on the postcentral gyrus; so that, as Penfield says, it is impossible to confine functional representation to strict cytoarchitectural boundaries.

"This upward migration of the primary motor strip," says Dr. Scarff, "is unique in man." But considerable shifting has taken place in the motor area of the cortex in the course of evolution. In lower animals the centres lie anteroposteriorly, and a pivotal movement has occurred, in which the leg has maintained its position at the medial border, while the head has swung downwards beneath it, thereby achieving the coronal disposition and arrangement found in monkeys and hitherto attributed to man. It is probable that the liberation of the arm with all its varied and delicate movements and the development of vocalisation into articulate speech have caused the further expansion which has finally pushed the leg centres "over the top."

CONSUMPTIVES NOT TO SLIP INTO THE ARMY

THE Minister of National Service has decided to ask every examinee who comes before a medical board for enlistment to sign a declaration that he has not at any time suffered from tuberculosis. This will certainly be some safeguard against consumptives slipping into the Army. But memory is never so fallacious as when presented suddenly with something to sign and the Minister of Health is taking the precaution of asking M.O.H.'s to supply the local officer of the other ministry with the names of all male persons born in the years 1920 and 1921 or between 1900 and 1907 inclusive who have been registered by them as suffering at any time from tuberculosis. This will eliminate another batch of these undesirable recruits. There is no mention in the circular (No. 2169) of the well-recognised value of mass radiography.

The University of Oxford has conferred the honorary degree of doctor on Prof. MARIANO R. CASTEX at the British Embassy in Buenos Aires. Dr. Castex has been head of the department of clinical medicine in the University of Buenos Aires for twenty-seven years and has come to be recognised there as the consultant's consultant.

Prof. HARRY PLATT has been appointed assistant consultant adviser in orthopædic surgery to the E.M.S. and Mr. J. RHAIADR JONES honorary adviser in rehabilitation. Mr. Jones is manager of the Derwen Cripples Training College at Oswestry.

We regret to announce the death this month on active service of Colonel ARNOLD GIBSON, L.D.S., assistant director of dental services to the Eastern Command.

1. Mair, W. *J. Path. Bact.* 1936, **42**, 635.
2. Neill, G. A. W. *J. Hyg. Camb.* 1937, **37**, 552.
3. Mair, W. *J. Path. Bact.* 1930, **33**, 230.
4. Holt, H. D. and Wright, H. D. *Ibid*, September, 1940, p. 287.
5. *Arch. Neurol. Psychiat., Chicago*, August, 1940, p. 243.
6. Penfield, W. and Boldrey, E. *Brain*, 1937, p. 389.

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Special Articles

FUTURE OF THE FAMILY DOCTOR

By Douglas Hubble, M.D. Lond.
PHYSICIAN TO THE DERBYSHIRE HOSPITAL FOR SICK CHILDREN

The nineteenth century saw the family doctor at the peak of his influence. Stephen Paget has written of him in the person of his father-in-law, Dr. Velox, who had "a huge practice in the Midlands. By day and night, by road and rail, he drove his influence to every point of the compass, into half a dozen towns and fifty villages; a masterful man, dominant and positive, a born fighter, loving to besiege, in all honour and by declared war, the strongholds of other men. For thirty years he did without a holiday, never afraid of the rush of the day's work, the night-calls, the meals got anyhow, the nearness of a breakdown; then, victory, and a stately practice, unassailable, fortified in authority: at last, his name a household word, his face known everywhere, his presence felt, his anger dreaded, his verdict final, and no wonder, for there was no sounder judge of an obscure case, not in all England. For thirty miles round he was the man to have. In every country-house, in time of peril, the cry was, 'Send for Velox.'"

Like all Victorian portraits, drawn before Lytton Strachey taught the Georgians the art of denigration this Dr. Velox seems a little more than life-size. We are not told that he was intolerant of criticism and inclined to despise the opinion of his colleagues, that his superb self-confidence was often uncertainly poised, that his social conscience was negligible since he was entirely content with life as it was, and that he handed on to our unwilling and unworthy shoulders a load of infallibility under which we have been struggling in embarrassment every since. To-day the work and outlook of the family doctor have changed in the same degree as his environment.

THE CHANGING TASK

The growth of the public health services has subtracted much from his work. He has, speaking generally, no part in the antenatal services, the infant-welfare centres and the school medical services. This has not only seriously diminished his value and experience but it has set up against him another group of doctors whose function is to supervise growth and nutrition while he, for the most part, sees the family only in gross departures from health.

The increasing growth of specialism, made necessary by the advance of medicine, has also made great inroads on his work. Fifty years ago the family doctor was physician, surgeon, accoucheur. What claim today has he to any of these titles? A London surgeon wrote derisively four years ago (*Lancet*, 1936, **2**, 462) of the man who confides in moments of expansion that he likes to do a spot of surgery occasionally, as he would say that he likes to play a spot of golf. "Operating as a sport," he remarked, "is a purely British conception, and its home is the cottage hospital." There is universal agreement that the satisfactory practice of general surgery or any of the surgical specialties demands whole-time service. Surgeon, no more!

His claim to the title of accoucheur steadily decreases. The Scottish Health Services Report (1936) relates that of the 544 panel doctors in Glasgow more than a quarter do no midwifery at all and only 1 doctor in 8 (i.e. 68) attends 20 or more cases in a year. That is to say that in an urban area only 12% of the doctors working under the N.H.I. do sufficient midwifery to maintain a reasonably high standard of obstetric performance. It is probable that doctors working in rural areas and those engaged in middle-class family practice have greater obstetric experience, although even in such circumstances it is vastly less than it was only thirty years ago. The reasons for the decline in the family doctor's obstetrics are well known; they are the falling birth-rate, the growth of institutional midwifery and the increasing numbers of trained midwives.

He can view without regret the loss of surgical practice because it has brought nothing but gain to his patients; he may console himself for the diminution in obstetric practice by the increased leisure it gives him and the load of anxiety which it takes from him, but he cannot but deplore his restricted opportunities to become a good general physician. It is here that the lack of access to diagnostic facilities hits him hardest. His wealthier patients give him full opportunity for investigation, but his poorer patients inevitably leave his hands.

NATIONAL HEALTH INSURANCE

N.H.I. might do much to give him back his birthright; the restoration of lost clinical opportunity begins to be more important than the height of the capitation fee. What is his present function? Let P.E.P.,[1] a disinterested critic who believes that the future organisation of the health services in this country must be based on the family doctor, give the answer:

> "General practitioners are being taught at great trouble and expense to use modern diagnostic equipment, to know the available resources of medicine, to exercise judgment as between patient and specialist, only to be launched out into a system which too often will not permit them to do their job properly. Excessive numbers of panel patients and excessive demands for certificates and returns of all kinds quickly reduce the general practitioner to an agent for making out prescriptions (too often for mere palliatives), and for operating something more like a sickness licensing and registration system than a health service."

Many say that the next great step in the improvement of the nation's health services will be an extension of N.H.I.; it therefore becomes vitally important to assess the faults and virtues of the system. Its merits are that it has given the worker some degree of financial security in sickness, that it has given him easy access to a family doctor, and that it has improved the financial stability of many doctors in rural and industrial areas. It fails, however, to give a complete health service to the worker or an adequate opportunity to the family doctor, because it makes no provision for pathological, radiological or consultant services. The family doctor is thus left without facilities for diagnosis or opportunities for educative contacts with experts. All important work in the diagnosis and treatment of insured patients is done in voluntary and public-assistance hospitals by doctors who have no part in N.H.I. Moreover, the scheme was not designed primarily to improve the health of the workers and therefore has never been a sound clinical organisation; no clinical supervision is exercised, and there is no attempt to see that a high clinical standard of diagnosis and treatment is maintained. It often appears that the Ministry's interest in the performance of doctors is focused on the accuracy of their records and the cost of their prescribing. N.H.I. fails to make use of the full powers of the family doctor, neglects the hospitals and ignores the consultants, and any health service which does these things is no health service at all.

HIS PLACE AS GENERAL PHYSICIAN

Is it important that the family doctor should do something more than run "a sickness licensing and registration system"? What form of organisation will give him the best opportunity to serve the family? It is generally agreed that he has before him an extending field of work, and with these enhanced opportunities must come higher standards of selection, of training, of equipment and of performance. His function is to be the family's health adviser and the liaison officer between the patient and the specialist, the hospitals and the public-health services. P.E.P., with great vision, defines the family doctor as the "specialist in diagnosis," and goes on:

> "The possible causes of ill-health are so intimately bound up with the way of life of the individual that it is impossible to have a satisfactory health service in which diagnosis and responsibility for treatment are undertaken in ignorance of the family and working background of the patient. On the

1. Political and Economic Planning, (16, Queen Anne's Gate, London, S.W.1), which in 1937 produced a comprehensive report on the British health services to which I am indebted for much of my information.

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other hand, the complexity of modern medicine is such that it becomes one of the most important functions of the general practitioner to make the best use of the specialist services available to him."

The need for the general physician is illustrated in this true story of six specialists and no doctor.

There was a man with inframammary pain who betook himself to a cardiologist, who suspected a spinal-cord lesion and sent him to a neurologist, who diagnosed spinal osteo-arthritis and sent him to a radiologist whose X rays revealed nothing. Check. Being still in pain he went a little later to a chest specialist who discovered nothing but suspected a psychoneurosis and sent him to a psychiatrist who refused to get to work until the man had been to a clinical pathologist who reported that all blood examinations were normal The patient returned to the psychiatrist and was still in conference with him when last heard of.

The training, work, and interests of the family doctor of the future must be those of a general physician. There are some who believe that he should carry on the practice of a small specialty in addition to his ordinary work. Others suggest a small grouping of family doctors round a small diagnostic and therapeutic clinic. Such attempts cannot be ultimately successful in the face of a rapidly increasing specialism; there are already sufficient whole-time specialists to make the pursuit of a part-time specialty unproductive. In general medicine he has a legitimate field with steadily increasing opportunities for diagnosis and treatment. The advances of medicine in the last twenty years have been such that it is easily possible for the provincial family doctor of today to be a more efficient physician than the Osler of yesterday. It should not be assumed that this knowledge is too recondite for him. It will, no doubt, demand some alteration in his training, the essential parts of which will be general medicine, obstetrics, diseases of infancy and childhood, and psychological disorders, with diagnosis in the special departments, including surgery.

A FAMILY MEDICAL SERVICE

How shall these doctors be employed in the service of the family? Much disinterested opinion supports the extension of N.H.I. to the dependants of insured workers. This suggestion has obvious advantages but I believe it would be a disaster unless accompanied by vital changes in the N.H.I. The family medical service must be a health service while the N.H.I. is fundamentally a sickness service. If the N.H.I. were extended to include the family it would perpetuate indefinitely the schism between the public-health service and the private-doctor service. An increasing number of people look to some kind of state medical service as the health organisation of the future. I do not doubt that the state must soon accept full responsibility for the health of mothers and children.

Overlapping under the present system is illustrated by a characteristic example:

A pregnant woman is attended in sickness by a Dr. A, though Dr. B is doing the antenatal examinations and midwife C will conduct the confinement. After delivery, Dr. A attends both mother and child in sickness, but the child is taken to an infant-welfare centre for advice on diet, and is there supervised by Dr. D; either Dr. A or D may, and often does, refer the child to a local hospital where it is seen by Dr. E who may refer it back to Dr. A; or the child may become a chronic outpatient under a succession of house-physicians, Dr. F[n]. At school medical inspections the child is examined by Dr. G and possibly later by Dr. H. At the age of 14 he is given the right to choose his own doctor and, with characteristic independence, discards the family doctor, old A (of whom it is true he has seen woefully little) in favour of Dr. I.

A plan is outlined below for the organisation of a state family medical service; the fact that such a service would exist side by side with the N.H.I. would give rise to what P.E.P. calls an "unfortunate administrative dualism." It would, however, have the great compensating advantage that it permits of the *gradual* introduction of state control into both hospitals and private practice. In this way hardship would be eliminated and mistakes minimised, and it should be possible to retain much of what was best in the old system. It may be reckoned a demerit of this scheme that the father and the family have a place in two separate medical services, but I think this is better than including obstetrics and child health in a system which has the ineradicable inadequacies of the N.H.I.

SCOPE OF THE SERVICE

A family medical service must be a health service with a clinical organisation. It will be concerned with the health of the pregnant woman, conduct of child-birth, care of the child through its first dangerous months, full restoration of the mother to well-being, regular observation of the child's physical and mental growth, recognition of abnormalities and the remedial treatment of defects, and care of the mother and child in sickness. Its organisation must embrace obstetric units and control the available children's and obstetric beds in all hospitals. It must command the services of all necessary specialists, and adapt the present work done in antenatal clinics, infant-welfare centres and in school medical inspections, while extending the family doctor's domiciliary service. It must have the fullest possible liaison with the educational authorities, with the schools and the teachers, with all the voluntary organisations which take a hand in the development of the child's mind and body. And it must be based on four essential principles:

1. It must be regional in administration and elastic in construction. It cannot be limited by local government boundaries and it is impossible to devise one scheme which will satisfy the needs of such diverse areas as, let us say, Birmingham and Bournemouth, Glasgow and Ross and Cromarty, Caernarvonshire and the East End of London. This principle of elasticity within a regional executive is already accepted and is working well in the emergency hospital services.
2. It must be based on the hospitals, voluntary and public.
3. It must provide for what Osler called "the continuous education of the family doctor." This cannot be attained by a fortnight's postgraduate course once every five years in some distant city.
4. The regional directors and assistant directors of the scheme must be clinicians engaged in active practice. In no other way will the full coöperation of the family doctors be obtained. Bureaucrats, with or without a medical degree, will never command the loyalty that the practising clinician on the spot will elicit.

These principles underlie the following outline of a family medical service. The plan is given dogmatically not because it is regarded as the only possible scheme but to give a basis for thought and discussion.

THE UNIT

The foundation of the service must be the family doctor. At least ten thousand family doctors would be required for it in Great Britain and they would be drawn from the ranks of the existing family doctors and from those doctors now doing antenatal, infant-welfare and school medical clinics. It must be a young service; only men and women under the age of 40 would be accepted and the retiring age would be 45 for the family doctor, 50 for the group-directors and 55 for the regional directors. Doctors in retirement would be allowed to go into panel or private practice; but a recognition that obstetrics and pædiatrics demand minds and bodies that have not yet reached the arteriosclerotic years is essential. Special experience in obstetrics and child health must be demanded of all entrants at the inception of the scheme.

The family doctor would have care of a group of, let us say, a thousand children up to the age of 16, together with their mothers. The number of mothers might vary between 500 and 700, depending on factors affecting the birth-rate. Such a group would constitute a unit and would represent the maximum complement of any one doctor. It would probably be necessary to allow doctors in some circumstances to serve less than one unit, but possibly never less than half a unit. The doctor's time might then be occupied also both with N.H.I. and private practice. As long as there is a demand for private practice it should be open to doctors in the family medical service, though it might be wise to limit it to practice amongst mothers and children. The charge of a unit would allow leisure for private practice or hospital work. It would also be necessary to restrict

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the individual's right to a doctor of his own choice; there are, of course, many factors which even to-day limit his choice considerably. It should be possible to permit changes of doctor in most areas if adequate reasons were given.

Each unit would average about 70 childbirths a year. All these would be under the supervision of the doctor, but he would not conduct the confinement, although his attendance at least once during each childbirth would be obligatory. He would do all antenatal examinations in the presence of the midwife who would later conduct the delivery. The doctor's attendance would also be required for anæsthetics, beyond gas-and-air analgesia, and for difficulties during labour.

The family medical service would find its chief justification in the care of the infant during its first six months of life. McNeil maintains that the heavy infant-mortality after the first fortnight of life is largely due to the mismanagement of feeding, especially of breast-feeding. The management of the baby must be a direct concern of the doctor; it should not be left to the nurse.

The doctor in the family medical service will see the children in his unit at short regular intervals through the first year and, at gradually longer intervals, up to 5 years. These examinations will be made either at the public clinics, or, in some localities, at the doctor's house. There will be an opportunity for important diagnostic and therapeutic procedures—for example, the estimation of hæmoglobin at intervals during the first year, tuberculin-testing and diphtheria-immunisation during the second year. In this age-period from 1 to 5 years there is too often a lack of medical supervision. It is a period, moreover, when many psychological difficulties appear to be sown. The child's progress from egotism through family membership to communal sensibility is a journey of many mental and physical hazards and the family doctor should be qualified to give the necessary pilotage.

Medical examination of the child in later years will take place at school, usually in consultation with the school-master or mistress.

The service will include children up to the age of 16, the statutory school-leaving age; children aged 14–16 in employment are now included in the N.H.I.

The doctor's morning will be spent in visits which may average ten a day, three of which will probably be postnatal visits. His afternoons will be spent doing antenatal examinations (one clinic a fortnight), school medical examinations (one clinic a fortnight during the school term), infant consultations (one clinic a week) and regular examinations for children of the ages of 1–5 (one clinic a week).

Continuous education of the family doctor will be provided for in the hospital service attached to his group. Here he will act as clinical assistant for three months at regular intervals; post-mortem attendance, clinical conferences and ward rounds will be made available for him at all times. He will be able to make use of a complete consulting service, and will thus keep abreast of advancing medicine and maintain undimmed his early enthusiasm. A surplus medical staff will be necessary to act as locum tenens for holidays and sickness leave, and for relief work during times of epidemic disease. This staff will be drawn from young doctors who are not yet settled in the service and from those who have retired from it.

THE PLACE OF CONSULTANTS

For every group of 25 units (25,000 children and their mothers) there might be one group director with two assistant-directors. Ideally, the group director would be a physician in charge of children's beds in the local hospitals; he would presumably be denied the right to any private practice other than consulting practice as a pædiatrician. Both the assistant-directors would themselves be in charge of units; one of them with special experience of obstetrics and an appointment as obstetrician on a hospital staff would act also as obstetrical consultant for the group; while the other would be a physician, also with a hospital appointment.

Regional directors would be in control of a varying number of groups depending on local circumstances; it would probably be necessary to have regional obstetric directors in addition. These directors, though some of their work must be administrative, would be active members of hospital staffs and a preponderating part of their work would be consultant and clinical. They would include a general surgeon, a psychologist, a pathologist, a radiologist, an orthopædic surgeon, an ear-nose-and-throat surgeon, an ophthalmologist and a dental surgeon. The posts would be salaried, but recognised as part-time, and consultants would have access to whatever private practice was available.

Since much of this consulting work would actually be done in hospitals, the state would be given more control of voluntary and public hospitals than it has today. The service must control the necessary hospital beds and many of the hospital physicians and surgeons would be in the service as consultants or directors. At a rough calculation each unit of the family medical service would require two obstetric beds and two children's beds. The whole service, at this calculation, would require at least 40,000 beds, which is half the total number of beds available today in the voluntary hospitals. Probably less than a third of all the beds in voluntary hospitals are reserved for obstetrics and diseases of children, so a considerable number of beds for the family medical service would have to be found in the public hospitals where a large part of the country's institutional midwifery is already being conducted.

COST OF THE SCHEME

If the rates of pay prevailing in the public-health services were regarded as a basis salaries might be expected to range between £650 and £1500 a year. Even if most grades in the service had a limited amount of private practice in addition it is likely that the average net income of the family doctors would show a reduction of some hundreds of pounds a year. Against this would be set certain not inconsiderable advantages—a pension, increased security, more leisure, and improved standards of work. Moreover, in the next few years all of us will become accustomed to contracted standards of living and expenditure. An approximate calculation gives £24,000,000 per annum as the cost of such a family medical service to the state. If this sum cannot be found by the state, why should it not, for the main part, be found by the workers? It seems probable that a system of family allowances may be the next big social reform. As a quid pro quo the state might require from fathers a contribution towards the cost of the family medical service. Contributions might be on about the same scale as those to public medical services run by groups of doctors. Contributory schemes are popular, as the success of the hospital contributory schemes has shown. Each unit, if composed of 1000 children and 750 mothers, would produce £1300 p.a. at a rate of 4*d.* a week for each mother and 3*d.* a week for each child. The local authorities and the state would thus be left to find £11,000,000 a year; but the local authorities are already spending half this sum in their maternity, child-welfare and school medical services and in the upkeep of obstetric and children's beds in their public hospitals. The eventual cost to the state of providing an efficient family medical service might be between five and six million pounds a year. The scheme would prepare the ground for a further extension of the state medical services when that was considered desirable but such an extension need not be regarded as urgent, seeing that the family medical service would be working to ensure the full health of the next generation in so far as that was consistent with the environment of each individual.

From the Instituo de Medicina Social of Peru comes a monograph compiled by two of its staff, Dr. Soldan and Dr. Kuczynski-Godard, which will appeal not only to the medical man in the reader, though it is addressed to him, but also to the potential traveller who lives in most of us. It is the series of photographs illustrating the life of a tribe of Indians in a little-known forest region of Peru which gives the monograph its fascination. A remarkable diversity of human types is found within the limits of this single tribe. Negro, Mongolian, Jewish and European faces are all there, including one which would have served as a model for Piero della Francesca. Besides the people the monograph tells us about their houses, habits and diseases, as well as the country they inhabit, and the authors survey the medical problems raised by the presence of a primitive community in the midst of a much more advanced civilisation.

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CHANGES IN THE E.M.S.

THE terms of service in the Emergency Medical Service have lately been modified to suit the unexpected course of the war. The group officers of the London sectors, while retaining their present title, have taken over some of the former duties of hospital officers; they will arrange movements of patients, staff and equipment, control the use to which the various hospitals are put and advise on upgrading. Problems of transport between hospitals, however, remain in the hands of the hospital officers and their deputies, the medical officers of health in the various districts, who will also retain their control over first-aid posts and other A.R.P. activities.

The hospital officer for London will continue to supervise the first-aid and ambulance service and the work of the casualty bureaux in the region, as well as inter-hospital transport. The outlying sector hospitals will be primarily under the control of the group officer of the sector, who will discuss with the regional hospital officers concerned plans for the use of these hospitals, and for the transfer of patients from sector to sector or to neighbouring regions. Mr. C. H. S. Frankau, F.R.C.S., has the task of coördinating the work of the London sectors and the regions round London; he is assisted by Dr. W. J. Gill, on behalf of the L.C.C. and other municipal bodies, and Dr. R. E. Bonham Carter, on behalf of the voluntary hospitals. Group officers will still work in close touch with the municipal medical officers, and any instructions to municipal hospitals will normally be addressed to the M.O.H. rather than the medical superintendent of the hospital concerned. When urgency makes it necessary to send instructions to the superintendent the M.O.H. will be informed as soon as possible.

The following changes in the terms of service of class-3 officers have been approved by the Minister:

The limit of two sessions daily and the maximum quarterly fees of 120 and 75 guineas have been withdrawn; the maximum consultant fees for six months will be 240 guineas and for general practitioners 150 guineas, computed on the basic sessional fees which remain unaltered.

The advisory emergency hospital medical service committee have undertaken that practitioners will give service as may be necessary for the remainder of the half year after the maximum fees have been earned.

When a practitioner normally attends a hospital which is on the occupied-bed basis whenever there are patients requiring treatment within his specialty his fee will be derived from the pool provided by the capitation fees. Where he is summoned only when required he will be paid on a sessional basis.

Administrative work undertaken at the request of the hospital officer will be paid for at the appropriate sessional rate.

The separate sessional fee and mileage rate is to be replaced by a combined fee covering medical attendance and travelling costs. A scale has been drawn up beginning at 2½ guineas for specialists and 1½ guineas for general practitioners per session where the hospital is within two miles of the doctor's home and rising by 6*d*. per session for every extra mile up to eighteen.

The terms of service for class-1 and class-2 officers have not yet been decided, and their appointments are for the most part being extended on existing terms until the beginning of December.

VOLUNTARY HEALTH INSURANCE IN U.S.A.

(FROM OUR OWN CORRESPONDENT)

A YEAR ago (*Lancet*, 1939, **2**, 447) I described the genesis of a national association of medical groups concerned with the distribution of medical care on a voluntary insurance basis. At a conference in New York that July all those experimenters met for the first time and considered the difficulties of organising for group practice under existing state laws. At this conference Prof. J. P. Peters and Dr. Hugh Cabot upheld the ideal of good medical practice which the latter suggested they would not get so long as the emphasis was on age, experience and whiskers. The charter members of these groups were:

Civic medical center, Chicago, Ill.; Farmers union cooperative hospital, Elk City, Oklahoma; Group health association of Washington, D.C.; Greenbelt health association, Greenbelt, Md.; Group health association of New York; Group health mutual, St. Paul, Minn.; Milwaukee medical center, Milwaukee, Wis.; Ross-Loos medical group, Los Angeles, Calif.; Trinity hospital, Little Rock, Ark.; Wage earners health association, St. Louis, Mo.

At the first meeting of the new association, which is called Group Health Federation of America, the following officers were elected: Dr. Mahlon D. Ogden (Little Rock), president, Dr. H. Clifford Loos (Los Angeles) and Dr. Michael Shadid (Elk City) vice-presidents, Charles A. Marlies (New York), secretary-treasurer, and Martin W. Brown asst. secretary. It was decided that the officers and some other members should define and develop standards for coöperative medical practice and these standards have now been published.

1. The plans must provide medical care and preventive medicine given by and built around the general practitioner.
2. The operation of the plans shall not impose restrictions on the physician as to methods of diagnosis or treatment and shall not interfere in the physician-patient relationship.
3. The plans must have available equipment and facilities adequate to ensure full performance of the services arranged for or provided, and in general to provide a high quality of medical care.
4. The compensation of the physicians must be adequate and commensurate with accepted standards for the community served.
5. All plans shall be equitable and consistent with respect to the rights and obligations of subscribers and physicians, and shall describe specifically the types and amounts of health services to which the subscribers are entitled.
6. All medical services shall be rendered by or under the direction of graduates of recognised schools, duly licensed to practise medicine and where possible members of appropriate professional societies. All specialists' services shall be rendered by physicians qualified in the particular field. All nursing services shall be rendered by or under the direction of graduates of recognised training schools, duly licensed to practise nursing.
7. The plans must be economically sound and have financial status and operations which adequately protect the interests of subscribers and physicians.
8. The rates must not be excessive or inadequate.
9. After the first year of membership, statistical records must be maintained and reports must be submitted currently as prescribed by the federation.
10. A profit-making sales organisation shall not be given responsibility for promotion or administration. Promotion and administrative policies shall be dignified in nature and in a manner consistent with professional ideals.

The enforcement of these standards is in the hands of a group of visiting experts. The final decision of the board of directors as to whether a particular organisation may be accredited within the federation is made on the recommendation of this accrediting committee of experts after consideration of their report. It is interesting to see how careful these reformers are to eliminate the risks of group practice described so eloquently by your special commissioner in his "Battle of the Clubs" forty years ago.

BIGGER AND BETTER SHELTERS.—The A.R.P. Coördinating Committee, under the chairmanship of Prof. J. B. S. Haldane, was one of the first consultative bodies to propose heavily protected shelters, and the Government's technical experts recently approved the committee's designs for communal shelters which could be rapidly constructed. On Sept. 17 a deputation from the committee was received at the Home Office, and put forward a plan to secure a large and immediate increase in the production of cement. The Haldane shelters, advocated by the committee, would entail the use of large quantities of cement, the output of which could be increased by 50% if the committee's recommendations are adopted. No action has so far been taken, but to be useful these measures must be initiated soon. The committee also suggest that tunnel shelters could be used to supplement the Haldane shelters, and propose that bunks should be put up in the underground stations to increase their capacity; these bunks could be transferred to the shelters as they are completed. Additional tunnels, they think, could be driven with the help of unemployed miners, from the tubes or into hillsides, and existing tunnels could be converted, as at Southwark and Ramsgate. They suggest a survey of steel-framed and reinforced concrete buildings, whose basements and lower floors could readily be made safer than the standard forms of communal shelter now available.

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In England Now

A Running Commentary by Peripatetic Correspondents

MANY months before the start of the war owners of private houses up and down the country began to offer them for use as hospitals should the need arise. When war actually broke out these offers were multiplied a hundredfold. They were activated by all sorts of motives, some noble, others not so noble, and it is to be feared that in the first flush of enthusiastic gratitude many offers were accepted that would have been better declined with thanks. It is always difficult to look a gift horse in the mouth and politicians appear to find it even more difficult than ordinary mortals. It was considered desirable (or politic) that the wives of owners of private-house hospitals should be given an opportunity of taking part in their administration, and these good ladies were encouraged to act as commandants, an arrangement which as might have been anticipated has not always been attended with the happiest results. Commandants and matrons have not all seen eye to eye, but at least it has been secured that the matron is solely responsible for the nursing care of patients.

There must by now be hundreds of private houses of widely varying size and suitability equipped with a certain amount of medical impedimenta, all anxious to make a better show than their neighbours. This rivalry reveals itself in many ways—anxiety to treat acutely ill patients as distinct from convalescents, to be provided with an operating theatre, to be graded as of one-hundred bed capacity, and to admit patients directly. These private-house hospitals are rarely suited for the treatment of acutely ill patients and still more seldom are they capable of doing operative surgery under conditions that give either staff or patients a decent chance; but the urge to make a brave show is compelling, though nearly all the commandants realise that their neighbours' houses are suited only for the reception of convalescents. On the outbreak of war the commandant of one auxiliary hospital in our area, who had set her heart on dealing with acutely ill patients, was asked to take instead a hundred defective children from one of the cities. This did not fall in with her wishes at all and she spent a frenzied day telephoning to friends and neighbours in an attempt to get someone else to take the unwanted children, but to no purpose. At last she telephoned to the other end of the country to the house of a kinsman who happened to be in Alaska and told his butler to prepare to receive the defectives; the kinsman's feelings on his return can be left to the imagination. The hundred-beds fetish has its origin partly in the glamour of good round numbers and partly in the belief that this line marks a demarcation between one scale of personnel and salaries and another. All sorts of efforts are made to secure the desired quota, particularly where the reasonable capacity of the house falls between 75 and 80; but even when the possibilities are obviously much lower there is still a reluctance to break 50, or 40, or 30 as the case may be.

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While the commandants of these auxiliary hospitals have certain general characteristics they vary widely in their attitude to orthodox authority, in their methods of getting things, and in their whole attitude to their hospitals. A few are prepared to accept without question official pronouncements on questions of equipment, others argue with officialdom by post, or more vigorously by personal assault, while the daring minority, exasperated beyond words or profiting by experience, get what they need where they can and argue afterwards. The two last groups sometimes give their administrative masters a headache, and it must be difficult for officialdom to know which it likes least, the verbally bellicose or the more direct. Both are likely to achieve their ends in time, for constant nagging wears away stones, even official stones: there is for the onlooker a certain malicious satisfaction in seeing the look of anguish greeting recognition that another commandant has joined the ranks of the Amazons, as when Mrs. A announces that she will ask the turbulent Mrs. B how she meets a certain difficulty.

Most of the country-house hospitals are not lacking in amenity. They have spacious grounds and gardens, sometimes a pond to fish, though their very distance from the fleshpots may make them rather dull for patients and staff alike. Many of the houses contain Old Masters and other treasures that have been left in situ, and it is interesting to study the reactions of patients to their new environment. One of our satellite hospitals is liberally hung with fine old pictures as well as the usual heterogeneous assortment of family portraits, and our welfare officer, anxious to improve the shining hour, asked a patient from Yorkshire how he liked living among them. "They were bloody funny at first," was the rather disconcerting reply in a dialect that I cannot reproduce, "but I soon got accustomed to them." We have always been intrigued by the beautifully painted text that adorns the walls of the bathroom in the same house—"Whatsoever thy hand findeth to do, do it with thy might." Generally, patients go to these auxiliary hospitals willingly enough, especially when they are to be in the first batch of patients at a new hospital, for there is a belief that is difficult to dispel that special celebrations mark the opening of a new hospital. Doubtless there will come a time when it will be necessary to pass patients from base hospitals to auxiliary hospitals at the earliest possible moment, but so long as pressure on our accommodation is not too propelling we find some reluctance on the part of our senior staff to send patients to these hospitals, partly because of a conviction that patients can be restored to fitness more quickly in our own hospital, and partly, doubtless, because of a natural reluctance to hand over interesting cases.

For general administrative purposes auxiliary hospitals are grouped round parent base hospitals under whose wing they are supposed to function and from which they will in the main draw their patients, though some admit directly cases of sickness from their immediate vicinity. The day-to-day care of patients is in the hands of a local practitioner, often retired from general work. These auxiliary hospitals have their own administrative problems, apart from that of dual female control already mentioned—the curse of having to cope with a plethora of Army forms, of paying soldiers, of trying to secure hospital clothing and of discharging patients from the Army. There are problems inherent in the convalescent state of the patients and their comparatively long stay in hospital—difficulties of providing adequate recreational facilities and of welfare activity, problems arising from the issue of passes and from efforts to provide certain forms of treatment in small hospitals, sometimes situated in awkward country. But such difficulties are not insurmountable and on balance auxiliary hospitals undoubtedly form a useful addition to the country's resources, provided they are used for functions for which they are suited. Events may well render them much more important than they are today.

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"Now," said the examiner in first aid to the local Lancashire candidate, "what would you do for a case of strychnine poisoning?" "Ah'd gie 'im starch," was the answer. "Now just think again," said the examiner. The local looked baffled, and his next-door neighbour whispered to him, "Tha's thinking of iodine poisoning." "By gum, ah am an' all," grinned the local, "if ah gave 'im starch, it 'ud nobbut stiffen 'im!"

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It is not easy to decide when for any one person the battle of London actually started. There had been so many raids labelled officially "over the Thames Estuary" that one began to wonder whether German planes would ever manage to penetrate the outer ring of defences. Then one afternoon, after inoculating some mice, I had gone out on to the flat roof of the laboratory for a breath of air. It was one of those clear bright days with a sky of that powder blue which only Canaletto seems to have faithfully reproduced in his pictures of eighteenth century London. No sound of planes could be heard, and in fact there was nothing to remind one of a war except the silvery balloons idly floating above like queer Oriental fishes. Suddenly a tall building half a mile away burst into flames and bellowed out clouds of smoke. A minute afterwards there began that queer noise of a hundred

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cows that have mislaid their calves. A week later the blitzkrieg came to our very doors when, again before the song of the sirens, a bomb was deposited within a few feet of us. Ten yards further south and a now priceless collection of rhesus monkeys would have ceased to be of any further value for scientific research, but as it was the bomb after penetrating the pavement vented its fury on the water mains and only a single pane of glass was broken.

Every day since then, as one comes out from the station, the streets more and more resemble those of Ypres in 1915–16. And yet, to the bird's eye or possibly the Junkers-Messerschmitt view, there is surprisingly little change in London. St. Paul's and Westminster Abbey, the Houses of Parliament, Highgate Church and even Pentonville stand as they have stood for years. London in these early autumn days is still what she was to William Dunbar four centuries and more ago, "the flower of cities all." Whether London was ever "small and white and clean," as William Morris suggests, seems doubtful and there are lovelier cities by far—Edinburgh, Florence, Paris, New York. If only certain buildings, some of Gilbert Scott's pseudo-Gothics for example, could alone be selected for bombing all would be for the best. Yet even if all London were battered to the earth the spirit of her people would be unconquered. One of my laboratory assistants went home the other night to find his house without its roof, large holes in the walls and a time bomb in the road, so that nothing could be salved or saved. Worse still, his family had vanished into the blue and for more than twenty-four hours he could find no trace of them. When he turned up to work again, a little haggard but still as bright as ever, his only comment was "Well, I've seen many pictures of refugees in the last year or two. I didn't realise how easy it is to become one yourself."

* * *

This censoring of letters helps to fill up my time in those grey northern seas. My job is not to stop the professional spy—he wouldn't give me a chance—but the babblings of young men who in most cases that need my scissors are amiably trying to make their letters interesting. When this job was first thrust on me I often felt I was trespassing on holy ground, later I went through a stage of being bored, and now I skim through the letters almost mechanically, my eye automatically halting at name of place or ship, mention of movements or direction, or of incidents of war. This selective quality of eye and brain to notice certain classes of objects and be blind to others is remarkable. Coming back to London once after years at sea I spotted a tree sparrow feeding with house sparrows on Westminster Bridge and was pleased with myself, but I had completely failed to notice that during my absence they had built the County Hall. Later, on a passenger ship, I tried to improve my poor powers of observation by noticing one class of object each trip—e.g., hair, finger-nails, patent medicines in cabins on morning inspection—and I always found something interesting which would certainly have been missed if it hadn't been for this purposeful observing. On the trip when I "did" eyes I spotted a passenger with ochronosis; I cultivated him and even had to play bridge without stakes with him before I was sufficiently acquainted to get his story and a specimen of his urine, which gave that rich chocolate colour with Fehling. As a young man he had been rejected for life assurance, but had appealed, and been sent to Pavy, who immediately recognised the condition and allowed the appeal. He had some kyphosis like Osler's Maryland cases. The trip I did ladies dresses ended in disaster. On the way to Sydney the captain got a wireless from the company's agent in Auckland which we had just left: "Is Miss —— aboard, height 5 ft. 7 in., dressed in ——." When I went up to report the captain was talking about it to the purser, who was pointing out that there were 800 passengers aboard. "I suppose you don't know anything about her, Surgeon?" Dark blue dress with pink cuffs and collar, that was easy. "She's sitting on the starboard side of the promenade deck amidships," I said, and felt like S. Holmes, Esq. Later when the purser approached her she burst into tears; she had no ticket. She was a waitress in a restaurant in Auckland and had been serving two of our stewards there. "How lovely to go to sea," she had sighed. "Come with us," they said hospitably. She did, but her parents missed her and her Sunday dress, and made inquiries. After she had spent five days at a police station in Sydney we had to take her back, and the two stewards, both rather friends of mine, were sacked. I doubt if these observing exercises improved my powers of observation. I am still just as blind to things that don't interest me and mechanically spot things that do.

* * *

My young nephew collects stamps and shows a very definite evolution in the matter. Time was when high-coloured South Americans would lure him; we might almost call this the jackdaw stage. Somewhat later came a passion for sets (bower bird), and now it is Britain and British possessions only, which seems to indicate that well-defined territorial sense so marked in the robin. When I was a senior boy at school, we of the sixth used to worship from afar the great Asquith, and read his speeches. He had a trick of introducing a rare or obsolescent word from time to time, which sent us scurrying to the dictionary. I think we got a certain sense of companionship with our idol and also a sense of power from sharing with him the meaning of these words. At any rate one unconsciously started collecting them, and my collection has evolved on homely lines into phrases, strange thoughts, and aphorisms. The soul of collecting is classification, and here are a few specimens from my page for the miscellany of country practice: a parson explaining he was a poor preacher, "I'm no good in the wood"; a devout woman describing the clean smell of chrysanthemum leaves, "just like our Lord's washing must have smelt." I got rather a good one last week from a charming old Sussex worker, talking of his boyhood, "most days we had ten-to-one pie." Of course my collection isn't written—it only exists as cobwebbed bottles in my cortex. My professional page inevitably smacks of Gee: a nurse's remark, "What lovely complexions the colotomies have," or a surgeon's, "When I see a waxed moustache, I always have a Wassermann done." I expect this stamp has a later edition of lighter colour or different watermark, which connects those side-whiskers affected by some young men with a diplococcus, but I haven't got it yet, and spurn forgeries.

* * *

It was in 1936 after a trip to Germany that I first realised that another war was inevitable. As a result I and my small family moved from the proximity of power stations to the outermost ring of suburbs. Fifteen miles out and some four hundred feet up the Great Wen is only just beyond a low range of hills. Without realising it we had taken dress-circle seats for the nightly performance of the battle of London. The overture usually starts crescendo and diminuendo on the sirens, while the arrival on the scene of the gentleman who has been christened by my children Herr Ponk is the signal for the leit motif, the voice of London "whose artillery with tongue may not be told"—strange how modern Dunbar can be. The whole mise-en-scène with its queer lighting effects and sudden unexplained bangs and screams is strangely Wagnerian with a dash perhaps of the later Strauss. All that is wanted to complete the allusion is to have Adolf and Hermann singing in the foreground, Adolf in a blonde wig doing his best to look like Wotan, with Goering, who obviously has the right presence for the part, in the rôle of Brunhilde. I have been cured of any desire ever again to sit through a cycle of The Ring. There is however one snag about having a front-row seat for the battle of London. Although the Nazis have repudiated Max Reinhardt and all his ways, they are apt occasionally to ape his technique and to draw little or no distinction between the spectators and the stage.

As I wrote these words in what should have been the still hours of the night there were five resounding crashes. The house shook to its foundations and the French windows in the dining-room burst open. After a few minutes in which to allow Herr Ponk to get off stage I reached for my tin hat and ventured out to inspect the damage. The casualties were many—more than two hundred I believe—but the victims were beyond all human aid. They were my neighbour's prize Leghorns.

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Letters to the Editor

INFANTS IN DAY NURSERIES

SIR,—At the request of the Minister of Labour, the Minister of Health has asked certain local authorities to provide day nurseries for the children of women employed "in munitions and other factories which are essential to the war effort," explaining that "arrangements of this nature are required to facilitate the recruitment of the large number of additional women workers urgently needed without jeopardising the well-being of the children."

If these day nurseries were intended solely for "toddlers" the two Ministers would have earned our warm congratulations, but since infants aged one month and over are also to be admitted the scheme, in that respect, is open to severe criticism. As a result of many painful experiences every pædiatrician is aware of the danger of infection to the young baby, and has come to realise that the only adequate safeguard against this danger is to prevent that intimate and indiscriminate contact with other infants, children and adults which is almost certain to occur in these nurseries. Moreover, it is often difficult to persuade mothers to breast-feed their infants, a difficulty which will be increased by the apparent endorsement of artificial feeding by the highest official authority in the public health.

I was so concerned about these two aspects of the Ministry's scheme that I wrote to Sir Arthur MacNalty (chief medical officer to the Ministry) about them and also asked him if it was the considered policy of the Ministry of Health not merely thus to abstain from encouraging breast-feeding, but actually actively to discourage it. In the absence of Sir Arthur his deputy Sir Weldon Dalryple-Champneys sent me a full and courteous letter explaining the position of the Ministry. In the course of this letter he says that "every effort is made to separate such infants from toddlers," and gives a description of the means by which this will be done; furthermore, he states that "our view has been that the right place for young children is with their mothers, at least to the end of the breast-feeding period." Since that is the view of the Ministry, it is somewhat surprising that local authorities were not advised that children should not be admitted to day nurseries until the breast-feeding period was over—i.e., until the child was nine months old. Possibly, if strong enough representations were made to the Minister of Health, he might even yet issue such advice, and it is for this reason that I have addressed this letter to you and for the same reason I have brought the matter to the notice of the war emergency committee of the Royal College of Physicians.

The official unemployment figures do not reveal any shortage of female labour, but I understand that such figures are unreliable because, owing to the unequal distribution of the workers, there are certain areas where there is a dearth of female labour. It would, however, be interesting to know whether the dearth of skilled munitions workers in any area is so great as to make the employment of mothers of infants under nine months of age essential, since this group can only represent a relatively small fraction of the total number of female workers.

Birmingham, 15. LEONARD G. PARSONS.

TREATMENT OF WAR NEUROSES

SIR,—In the controversy on this subject insufficient attention has been paid to the differing circumstances in treating early cases near the front line and treating more chronic cases at the base hospitals. During over four years of the last war I had extensive experience of both types of work, and I found that a different mental attitude and a different line of approach on the part of the army medical officer were called for in the two situations. Early cases responded well to firm though kind treatment, by short methods of persuasion and explanation, and by the rapid recovery of "lost" memories in a state of muscular and mental relaxation. Adherence to strict military discipline and attention to the preservation of fighting morale were adjuvant factors in this treatment, and its success was proved by the return of about 70% of the cases to the firing-line after an average of a fortnight's stay in the casualty-clearing station or stationary hospital. Out of 2000 to 3000 cases which I saw on the Somme between autumn 1916 and spring 1918, only 3% were malingerers and 11% were psychotics. The men sent back to the line included soldiers of proved courage, and the great majority of them stood up to fighting conditions afterwards.

On the other hand, more chronic cases such as I saw at Maghull Military Hospital in 1915 and at Craiglockhart War Hospital in 1918 needed more prolonged and detailed psychotherapeutic treatment, by the methods of deep mental analysis and autognosis, and the majority of them were found to be unfit for front-line duties or were invalided out of the service. It would probably have been better for the state and for themselves if they had never been taken into the service—with certain outstanding exceptions. As the war proceeds the need for trained psychotherapists will become ever more apparent.

WILLIAM BROWN.

Institute of Experimental Psychology, University of Oxford.

SIR,—May one engaged in general practice support the pleas published in your columns for the intelligent and coördinated treatment of the various forms of war neurosis, both in civil and military life? I have recently seen two soldiers, home on leave, who were severe and untreated cases of this kind. In each instance they were admitted to a military hospital; in each instance they returned to me a few months later having received no treatment whatever, so far as I could ascertain, for their real and serious disabilities. The longer these cases go untreated the more difficult they become to treat. These unfortunates are wasting their own time and the country's money and are being demoralised. Little notice appears to be taken of any report sent forward by a general practitioner to the military authorities. The patients seem to be treated as a rule "by studied neglect" and regarded with hostility by the military doctors.

Exactly the same is happening to many civilian cases, both male and female. As medical referee to a sick-benefit society I see numbers of untreated cases of war neurosis, most of which appear to be remediable. I agree with the proposal for the setting up of military rehabilitation centres. The essence of cure is social rather than personal therapy. The problem of the civil cases must be dealt with by our profession; otherwise it will certainly be dealt with by the creation of a new profession, outside our ranks, to the permanent impoverishment of medical practice.

Worcester. HOWARD E. COLLIER.

SIR,—I am interested in Sir Arthur Hurst's remarks on my letter. I should be still more interested to learn which "simple forms of psychotherapy" he would advise in the three cases I quoted. One was simply cured, after other "simple" measures had failed elsewhere. The others, victims of therapeutic and diagnostic naïveté, are cases needing highly specialised methods. Sir Arthur is mistaken if he reads into my letter any suggestion that the simple acute neuroses are difficult to treat. Delay and diagnostic error are the factors I would wish to see eliminated. The self-confidence of the inexpert physician may produce some good results. It will certainly produce many bad ones. If a specialist is available, why not use him?

St. Mary's Hospital, Paddington. GEORGE PEGGE.

PSYCHIATRY AND THE WAR

SIR,—Almost every Friday afternoon it was (and possibly still is) customary for the staff at Cardiff mental hospital to meet to discuss the week's work. On these occasions my old chief, Edwin Goodall, used to preface the proceedings by saying: "Now, there's talk . . . and there's work."

Almost every Friday morning since this war began I have been forcibly reminded of the sagacity of his aphorism by the remarkable quantity—not to say quality—of the psychiatric material which finds its way into one or another of the medical publications. We have had a wide variety of views paraded before us on the

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subject of "war neurosis" whatever that may be. Not having seen a case myself, although practising in an area which receives many evacuees and not a few service patients, I gather that it is on the one hand regarded as the result of impounding the narcissistic libido and on the other it may, consistently enough, be taken to be a curious neurophysiological syndrome known as scrimshanking. It is never by any chance a straightforward condition of schizophrenia, paranoia, G.P.I., or mental deficiency. There must have been a noteworthy mutation of clinical type, for these unambiguous diagnoses cover the vast majority of psychiatric cases remaining from the last war, many of whom continue to be under treatment in the only places which are capable of treating them—namely, the ordinary unglamorous and largely ignored mental hospitals of the country. Twenty years ago the writers of the day called these conditions "shell shock" or "neurasthenia," but with the passage of years the true diagnosis in intelligible terms of ordinary psychiatry became so insistent that it was in many cases entered in the records as it should have been in the first place had there been more work and less talk. Nowadays apparently you are not allowed to be shocked by a shell, but it is quite legitimate to become neurotic because of the war.

Innate suggestibility coupled with immature character development is a condition necessarily precedent to the development of a great many neuroses, and if there is one thing which is likely to be the very coping stone of the ætiological factors necessary to build up a neurosis it is the suggestion contained in the expression *war* neurosis. In the name of reason, why *war* neurosis? Why not war pneumonia, war influenza, war diphtheria, war pellagra or even war amenorrhœa? For the war is just as likely to be an ætiological factor in these conditions as it is in psychiatry. Of course this innate suggestibility cuts both ways, because at least one successful therapist believes that the less you know about psychiatry the more quickly you can cure a neurosis, presumably by suggesting to the patient that, as you cannot understand it, it therefore cannot exist. All you have to do is to fill the hospital, mobile unit or what-not with doctors who know practically nothing about psychiatry, and the patient is cured almost before his name has been entered on the bed-card. This is a pleasing notion, and when we psychiatrists have been driven out of business by our lack of ignorance I must remember to try it on a series of dermatological cases, as I think it must be quite pleasant to be a dermatologist and I know nothing about skins except that they seldom grace your columns, even in the guise of war-impetiginous states.

However, enough of this talk. I must to work, in the hopes that many of your psychiatric contributors will join me in getting on with the job and will resolve to offer their material to your editorial discretion only when they have some facts to add to our knowledge and are capable of stating them without the pathetic controversial setting which so often mars, if it does not actually obscure, useful records of experience. The fact seems to emerge that war psychiatry is no more different from peace-time psychiatry than war medicine as a whole is from peace-time medicine as a whole, and it is a fundamental mistake in approach to any problems which may present themselves to suppose otherwise. New clinical types do not suddenly arise because of war conditions. The colouring may change a little, and the relative incidence perhaps of the various states, but at heart it is still the same psychiatry that some of us have been pegging away at for a good many years.

Stone, Bucks. IAN SKOTTOWE.

CORONARY INFARCTION

SIR,—At the risk of being dubbed a pedant may I plead for adherence to a more precise terminology in reference to that cardiac catastrophe and its sequelæ which have recently received the new and meaningless title of "coronary infarction"? The causative condition is widely and correctly known as acute coronary occlusion, and this may be due to coronary thrombosis or more rarely to coronary embolism. Its result, when not immediately fatal, may be *cardiac infarction*, either gross or molecular. "Coronary occlusion," therefore, should be used to describe the initial condition of acute reflex sympathetic shock, with its associated arrhythmias, and "cardiac infarction" to denote the sequel of fever, pericardial friction and electrocardiographic changes. Thus strictly it is incorrect to talk about T1 and T3 types of coronary thrombosis. The absence of these phenomena does not rule out a clinical diagnosis of coronary occlusion, but suggests that infarction of the heart has not followed. The diagnoses clearly carry different implications, coronary thrombosis implying only coronary artery disease but cardiac infarction damage to the myocardium as well.

A similar confusion of thought and terminology breeds in students the mistaken notion that tenderness and rigidity are signs of an acute abdominal catastrophe. In fact, the only non-specific signs of the latter are those of reflex abdominal shock; tenderness and rigidity indicate that peritoneal reaction has developed.

Lambeth Hospital. H. E. MANSELL.

DEATH AND DYING

SIR,—Professor Ryle's article of Sept. 28 is doubtless purposefully provocative and you will perhaps allow me to be purposefully provoked.

No man, I think, writing on death and dying can be such a diehard as to preach a negative philosophy in A.D. 1940 in total disregard of such advocates of immortality as Socrates, Cicero and Jesus. One must presume that anyone who holds himself equal to pronounce on ultimate things has at least familiarised himself with the Platonic dialogues. Professor Ryle, therefore, must have for his own purposes repressed these authorities from his mind. But when he writes that religion and superstition (note this conjunction of terms) have persistently aggravated fear, is he asking his readers similarly to repress from their minds the examples of men who, like Socrates, have passed through the phase of death without fear, because (or in spite) of their conviction of the immortality of the soul?

Why should we be asked to base our attitude towards these matters on the reactions of those to whom death means annihilation rather than life? Certainly not because their names have lasted longer in history, for the contrary is manifestly the case. Yet it is common knowledge that the poor patient, even when not reinforced by any clear conception of Christian doctrine, does not, any more than did Shelley, believe in death. Anyone who seems to himself to *know* that physical death is the end of the individual must in his own light be wiser than Socrates, and indeed wiser than Shakespeare, and we should possibly wish to hear more from such a source. But the assumption that action is healthy and thought morbid seems wearisomely typical of a generation hypnotised by what Joseph Conrad called "the illusion of activity."

Hothfield. MARTIN O. RAVEN.

REFERRED PAIN

SIR,—In your leader of Sept. 28 a viewpoint which I and others have found helpful is not noted; surely all perception of pain from deep structures must be referred and therefore poorly localised. As I have pointed out elsewhere the evolution of the species is general and the sensory nervous system in particular is not likely to cater for improbable pathological experiences. Only the superficial structures can therefore be expected to be endowed with that necessary perception of noxa which we call pain, in order that such noxa may be avoided, and the life of the individual be perpetuated. The interior should never come in contact with such noxious stimuli and therefore cannot be expected to possess a sensory innervation to deal directly with them.

If differences in tension or toxins of infecting material irritate the nerve-endings in viscera or deep structures, then either direct neural or chemico-neural stimuli pass via the vegetative system to the spinal or medullary-thalamic centres in autonomous connexion and thence stimuli flow out through the sensory nerves belonging to the myotomes in neural connexion with the irritated focus. This is Mackenzie's conception, but he appears not to have realised why it must be so. The skin, subcutaneous tissues and the superficial muscles must be able to perceive noxious impacts and express them in a manner which takes precedence of all other sensations—

i.e., as pain. These tissues can and do localise such noxa accurately. But when the deeper structures throw out distress signals there is the likelihood of autonomic spread-over to several spinal or other centres and the localisation will tend to be diffuse and not accurately localisable. The knowledge of the possible sites of registration of irritation from deep structures is of diagnostic value.

For example, the pain of angina pectoris is perceived mainly by sensory fibres traversing two or more of the following left-sided muscles—scalenus anticus, triangularis sterni and anterior end of the fifth intercostal. Irritation of these nerve-endings by pressure will at once evoke an attack of angina if subliminal irritation is present in the myocardium. But if these sites are previously anæsthetised with novocaine, or amyl nitrite be inhaled, no pain follows the procedure; only sweating and pallor. Either of these manœuvres will prevent angina following effort procedures known to be provocative of it without such pre-treatment. Thus the pain felt from a possibly small patch of ischæmic myocardium is diffused to widely spaced subcutaneous sensory nerve-endings.

Bristol 8. A. T. TODD.

COMBATING SLEEPLESSNESS

SIR,—I do not think enough use is being made of bromides to combat the sleeplessness of air-raids. People have been coming up to see me in the morning shaking and anxious and saying "It's no good, I can't go on and I must be evacuated." I've said, "Take three doses of this before bedtime, and see me tomorrow morning." And a large proportion of them have been able to carry on. Most of them have dyspeptic symptoms, so I give them bromide in a bismuth mixture with some rhubarb in it. I have found the ordinary doses quite useless, but most people can take gr. 30 of sodium bromide three times a day or a single dose of gr. 30–60 quite easily. These large doses are very salt and need watering down, but a draught of water afterwards will completely wash away the taste. A dose of gr. 30 three times a day will make most people face what is going on calmly and sleep well of a night. It does not prevent them from waking up and becoming immediately alert when the need arises, and it does not leave them with a heavy head in the morning.

Merton Park, S.W. TAYLOR HARRIS.

SOIL FERTILITY AND HUMUS

SIR,—In response to your invitation (*Lancet*, July 20, p. 83) to produce evidence that Guernsey cows and other livestock show a preference for fodder grown on soils rendered fertile by humus, I should like to state that this has already been done. The matter is referred to in Sir Bernard Greenwell's paper published in the *Journal of the Farmers' Club* of February, 1939. Further evidence on this subject will be found in my recent book "An Agricultural Testament" (Oxford University Press). Many of our most observant farmers are aware of the value of animals in synthesising, as it were, the factors which matter in nutrition. The grazing animal invariably prefers the produce of soil in which humus is being prepared naturally from vegetable and animal wastes underneath the turf to produce on similar soil where some factor such as want of oxygen or of animal wastes are preventing humus formation.

In countries like France, where the women are intensely table-proud, the superiority of vegetables grown by means of farmyard manure over the produce raised by artificials is almost universally recognised. When the women of England, who as a body might be described as house-proud rather than table-proud, acquire the knowledge possessed by their sisters in France a great advance in the nutrition of our population will take place. In the meantime much can be done by private individuals and institutions by dividing their vegetable areas into two parts: one manured by farmyard manure or humus, the other by means of chemical fertilisers. The great differences in keeping qualities, in taste and in satisfying power between these two classes of produce will form a good foundation for the nutritional studies of the future.

Blackheath, S.E.3. ALBERT HOWARD.

E.M.S. SALARIES

SIR,—I have carefully read Sir Ernest Graham-Little's letter and eventually gathered he was pleased that certain advice he gave over a year ago regarding the establishment of the E.M.S. was about to be taken, although, regretfully, only as regards one special group. Being in that special group I was naturally interested in this vindication of Sir Ernest's judgment, and wondered if he would care to offer some further advice on a problem which has been troubling me for some time, and seems likely to become even more urgent when his prediction is fulfilled. Lest it be thought that my professional principles are on a lower plane than Sir Ernest's, it is permissible to indicate that I fully accept the voluntary principle of medical attention of the sick poor, and that at no time did I seek to avoid this, as my membership of the staffs of three voluntary hospitals proves. In common with many other consultants I found myself allocated to the E.M.S. (although I had answered the B.M.A. memorandum in terms indicating I was freely available for any surgical work abroad or at home), and thus prevented in the early stages of the war from easing my boredom by joining the Armed Forces. Later this boredom became insupportable, and I accepted the offer to come out on part-time work, and also obtained permission to join the Forces, if possible. I then found the latter almost impossible of achievement. It was clear even before the war that London was likely to become a "depressed area," and I doubt whether any E.M.S. scheme which did not involve full-time work and pay would have been accepted by most of the younger consultants. In that case they would have been able to join the Army as consultants with majorities, and fill the vacancies now occupied in many cases by their own house-surgeons and registrars. (The R.A.M.C. found it difficult to get men at the beginning of the war when most of the London consultants were in the E.M.S.) Their contracts would have then gone on until the end of the war, although they would now have as little to do as the E.M.S. men a year ago. Surely one service is as good as another, and if the Armed Forces retain their men, so should the E.M.S., or at any rate men unwanted in the E.M.S. should be drafted into the Forces as required by expanding establishment. However, if this is not conceded as a principle, why should the brunt of the Treasury attack fall upon those men who found boredom insupportable? Class 1 is class 1 whether or not any individual is whole or part-time, and the class should be considered as a whole, especially as the very job for which it was organised is now at hand.

It is urged, and I feel sure Sir Ernest is in agreement, that every unnecessary person should leave London, and most have not lingered upon the urging. It can be no secret from Sir Ernest that this includes largely the people whose private fees make possible the consultant's acceptance of the principle of voluntary hospital service. My acceptance of this principle is still intact. I also agree that anyone who need not live in London should get out of it lest he become a needless casualty. Apparently, the Treasury say that the reward of abhorrence of inactivity is an occasional sessional guinea, whereas the willingness to be bored is to be compensated by a continuation of the tenure of service.

Speaking as a younger consultant, my private practice has now almost completely disappeared; my whole-time services are not wanted; my part-time retainer is to be discontinued, or reduced, or perhaps even abolished. Please, Sir Ernest, how am I to exist in order to continue to accept the voluntary principle?

Wimpole Street. MAXWELL ELLIS.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—Demonstrations of museum specimens will be held at the college, Lincoln's Inn Fields, London, W.C.2, this month on Mondays and Fridays at 3 P.M. Today, Oct. 11, Mr. C. E. Shattock will speak on tumours of bone, and on Oct. 14 on tumours of the kidney. On Oct. 18, 25, and Nov. 1, Dr. A. J. E. Cave will show anatomical specimens, and on Oct. 28 Mr. R. Davies-Colley will show specimens illustrating inflammation of bone. The course is open to advanced students and medical practitioners.

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Public Health

CEREBROSPINAL FEVER IN SUSSEX

REPORT ON 20 CASES

By MATTHEW HUNTER, M.B. Edin., D.P.H.

THESE notes refer to a series of 20 cases, treated at an infectious-diseases hospital, of which all but 2 were admitted in 1940. There was 1 death and only 3 cases had major complications. This compares favourably with the results published in THE LANCET (1940, 2, 216 and 196) from Wrexham (19 deaths in 154 cases; 12·3%) and Croydon (7 deaths in 31 cases; 22·6%). The ages ranged from three to fifty years. All the cases were either severe or moderately severe, and in view of the mortality in the last epidemic (1915–16–17) I find it hard to believe that many patients would have recovered without chemotherapy.

There was a rash in 4 cases, but only in 1 was it really typical. Meningococci were isolated from the cerebrospinal fluid in 16 cases but were not typed. In the remaining cases there was no reason to doubt the clinical and laboratory diagnosis. The standard treatment was M. & B. 693 in the dosage advocated by Banks and adopted later by the Ministry of Health.[1]

Age in years	0—	2—	5—	10—	15+
Daily amount in grammes ..	3	4½	6	7½	9

This amount, divided into four-hourly doses, is given four-hourly for the first 3 days, and thereafter gradually reduced over the next 4–6 days.

Antimeningococcal serum was given to 6 cases either intravenously, intramuscularly or intraperitoneally, in addition to their M. & B. 693. It was only given intrathecally to 1 patient. No patient was treated with serum alone; 2 patients treated with serum and sulphanilamide had a "stormy passage." Lumbar puncture was carried out fairly often for the reduction of pressure, alleviation of symptoms, and as a check on the success or otherwise of the treatment. A single diagnostic puncture may suffice for mild cases, but repetition appears to be of definite value in the severe ones. In 12 cases treatment had been begun prior to admission to this hospital, a fact which has a bearing on the varied lines of treatment, and possibly on the complication-rate.

Of the complications, 1 patient developed almost absolute unilateral nerve deafness; 2 had effusions into the elbow-joint which settled down without requiring local interference; 1 knee-joint required several aspirations, and despite long rest in bed the effusion always recurred with weight bearing and a walking calliper was required; 2 cases given M. & B. 693 soluble before admission developed ulcers of the buttock, one of large size; 2 cases were given M. & B. 693 soluble intrathecally (also before admission). The first, a youth of nineteen, stated that his left leg became numb after the injection, and soon he exhibited a drop foot—a typical anterior-horn-cell lesion. This was six months ago, and improvement is very slow. The second, a woman of forty-eight, was given M. & B. 693 soluble intrathecally at the initial lumbar puncture; subsequent punctures failed to withdraw any C.S.F. and although she was too ill and irrational to give an account of her symptoms it appeared that her legs became increasingly weak until she died on the fourth day. No autopsy was performed. This was the only death in this series. Thrower[2] has drawn attention to the high alkalinity of the sodium salt of M. & B. 693 and the necrosis of muscle it may produce when introduced intramuscularly. These two cases suggest that the compound should not be given intrathecally.

The impressions gained from this series are:—

1. That adequate doses of M. & B. 693 produce a rapid improvement in symptoms, and a low mortality. It is much superior to sulphanilamide. The only toxic reactions were cyanosis, nausea and one rash, which small doses produce to the same if not to a greater extent.

2. Antiserum seemed to be of value in very severe cases and those not showing the usual rapid improvement with M. & B. 693.

3. The intrathecal administration of M. & B. 693 soluble is undesirable, in spite of the lag between administration by other routes and the attainment of a maximum concentration of the drug in the C.S.F.

I wish to thank Dr. Rutherford Cramb for permission to publish this report, and Dr. G. C. Gundersen for his help with the cases.

1. See *Lancet*, 1939, 2, 921 and Ministry of Health Memo. 234/Med.
2. Thrower, W. R. *Proc. R. Soc. med.* 1940, 33, 555; see *Lancet*, 1940, 1, 967 and 1090.

Panel and Contract Practice

The London Air-raids

INTENSIFICATION of aerial attack on London, resulting in the damage or demolition of many practitioners' surgeries, has led the panel and insurance committees to issue an appeal to every practitioner on the insurance panel. Those already approached have been standing by their unfortunate colleagues who have been bombed out and the others are invited to assist by attending any person who claims to be insured whether that person is on his list or not. Insurance prescriptions and certificates should be supplied to such applicants without charge. At a meeting of the London insurance committee on Sept. 26 it was reported that the appeal had met with a wide response. Not a single voice had been raised against it. It was reported at this meeting that four London insurance practitioners had been killed.

Supervision of Sickness Claims

Commenting on the effect of regional medical service on the supervision of claims for benefit the *National Insurance Gazette* admits the moral effect of the service and its convenience in securing a second opinion. It had in fact become the custom not to strike a member off the sick fund (when the society was not satisfied about his total incapacity) without an examination by the R.M.O. This has led to a belief on the part of insured persons that their society could not put them off the sick fund without such an examination. This was of course erroneous. A society is entitled to act upon the evidence in its possession and if that evidence shows that the claimant is no longer totally incapacitated the society is entitled to cease payment notwithstanding the fact that the insurance practitioner continues to issue weekly certificates. Again, when a second medical opinion is obtained, whether from the R.M.O. or from an independent medical referee, the society is not bound by it. It is the society's responsibility, not that of R.M.O. or medical referee, to decide whether or no the claimant is entitled to benefit. Should an appeal be lodged it is not against the medical decision, but against the decision of the society which has to appear in the character of respondent. The *Gazette* suggests that sickness visitors can do much to assist societies to view claims in their proper perspective, and pleads that sick visitation should be regarded as complementary and not inimical to the medical certification system. There is, however, an essential difference: the practitioner is dealing with an insured person as a patient, weighing whether it is in the interest of the patient's health that he should return to work forthwith or whether the risk of further illness would be reduced by an additional period of convalescence. Some approved society administrators are obsessed by the words "incapable of work"; if an insured person so certified is found digging for victory in his garden he is at once put down as a fraud. The doctor knows that a person may be capable of gardening but that he ought not to return to work until his recovery has become consolidated. The R.M.O. could be trusted to consider the medical as well as the administrative aspect of cases referred to him and this useful service should be reinstated at the first opportunity. Meanwhile many societies are arranging for independent medical examinations in cases where they are in doubt.

The distinguished service cross has been awarded to Temp. Surgeon Lieutenant (now Temp. Surgeon Lieut.-Commander) W. B. D. Miller, R.N.V.R., for gallantry and devotion to duty in operations in Norway.

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Obituary

FREDERICK GEORGE THOMSON

M.A. CAMB., M.D. LOND., F.R.C.P.

Dr. F. G. Thomson, who collapsed while visiting a patient on Sept. 25 and died almost immediately, had lived and worked for nearly forty years in Bath. After a brilliant career as a student at Cambridge he entered Middlesex Hospital where in 1899 he obtained first-class honours in the London M.B. and later the gold medal for his M.D. thesis. He held the post of senior demonstrator of physiology and biology at the Middlesex and also house-appointments at the hospital before in 1900 he became medical officer in charge of the British Hospital at Oporto. Here he built up a private practice and remained till 1906 when he settled in Bath. He soon gained a high reputation as a general physician and specialist in rheumatic diseases, and was appointed consulting physician to the Royal United Hospital and the Royal Mineral Water Hospital, and later to the British Red Cross Clinic in London. His writings were chiefly on rheumatic diseases and his book on Chronic Rheumatic Diseases, which he wrote in collaboration with R. G. Gordon, ranks high as a scientific and practical treatise. When the British Medical Association met at Bath in 1925 he was elected president and he chose as the subject for his address the evolution of a spa. He was also the first president of the section of physical medicine of the Royal Society of Medicine when it was formed in 1931 by the fusion of the sections of balneology and electrotherapy.

Herbert Lambert, Bath.

Thomson of Bath (for so he was known to his contemporaries) was one of a group of physicians who raised the practice of physical medicine in the spas from pure empiricism to its rightful place in therapeutics. He felt that the medical student is taught little about hydrology while the general practitioner often regards it vaguely as something unorthodox and a little suspect. In his Physiology and Principles of Hydrology (also written jointly with R. G. Gordon) Thomson tried to help the practitioner to decide for himself when hydrotherapy would be of benefit to his patients. And when the British Health Resorts Association met at Bath in 1937 he urged them to sponsor a series of scientific investigations into the physiological properties of mineral waters. The spas need men of his stamp and many who worked with him will miss a genial colleague.

ARTHUR PERCY DODDS-PARKER

B.M. OXFD, F.R.C.S.

Mr. Dodds-Parker died at Oxford on Sept. 22. By his death the Oxford medical school has lost not only one of its best but one of its best loved sons. Coming up to Magdalen College in the late '80s, writes P. N. B. O., he proved his metal at once by getting into the university boat in the days of Guy Nickalls, and after taking an arts degree he studied medicine first at Oxford and then at Middlesex. Returning to Oxford in 1897 he started his career there as a demonstrator of human anatomy under his great friend the late Prof. Arthur Thomson and subsequently as a surgeon to the Radcliffe Infirmary. "A.P.," as he was called, will be affectionately remembered by the large number of Oxford medical men who passed through his hands as reader in applied anatomy or learned the elements of surgery from him at the Radcliffe. He was a most successful teacher, always emphasising the basic principles of his subject without undue elaboration of detail. As a surgeon, during the first twenty years of this century, in particular, he commanded a leading position in both city and county. His careful methods and sound judgment, added to a great measure of human understanding and generosity, were quickly appreciated by all who had occasion to consult him. After his retirement he found time to serve on the city council where his medical knowledge and common sense proved useful. Throughout his life he was a man of action rather than of theory—a keen sportsman, good at golf, fishing and shooting. In his later years he showed an increasing interest in the arts and became an authority on the museums and art collections of Oxford and London. A wide circle of friends will mourn his loss.

THOMAS CLARKE

M.D., M.CH. R.U.I., J.P.

Dr. Thomas Clarke, who died at his home in Liverpool last month, was one of the senior magistrates on the city bench, to which he had been appointed in 1897. He was born in co. Antrim in 1846 and qualified from Queen's University, Belfast, in 1871. His work as a ship's surgeon brought him to Liverpool, and in 1875 he was appointed medical officer at Brownlow Hill workhouse. The following year he became honorary physician to the Liverpool Consumption Hospital, a position he held for thirty years, and later medical officer to the education committee. He decided to settle in Liverpool and about this time set up in practice at Edge Hill. He often recalled how in his first two months he earned less than £1, but his practice soon developed and he attended patients as far afield as Manchester and Southport. Later his son, Dr. T. Courtenay Clarke, joined him in partnership.

Dr. Clarke's wish to implement reforms in the services of the city led him to seek election to the council of which he became a member in 1895. He was elected an alderman in 1901 and resigned in 1903. As chairman of the port sanitary and hospitals committee he was able to do much to obtain proper hospital facilities for infectious diseases and he was largely responsible for the rebuilding at Mill Lane and the acquisition of the Fazakerley estate where the present hospital now stands. Dr. Clarke was also for many years chairman of the old West Derby parliamentary division. He was a prominent freemason and in 1888 served as provincial grand registrar. He had seven sons and four daughters, of whom two sons and three daughters survive him.

RUPERT WELPLY

M.R.C.S.; CAPTAIN, R.A.M.C.

Captain Rupert Welply was killed in action at Dunkirk last May. He was born in 1911, the only son of Dr. George Chinnery Welply of Forest Gate. He qualified from St. Bartholomew's Hospital in 1938 and after acting as dresser to Mr. Reginald Vick joined the R.A.M.C. He was awaiting orders to sail to Bombay for five years when war broke out, and he was sent instead to France, where he was attached to the R.A.S.C. headquarters.

BETTY MARGARET ZEAL

M.B. LOND., D.P.M.

Dr. Margaret Zeal was lost in the Atlantic when the *City of Benares* was torpedoed on Sept. 17. She was educated at St. John's School, Bexhill-on-Sea, and at Bedford College, London, and she took the M.B. in 1934 from University College Hospital. She held house-physician's appointments at the New Sussex Hospital and the Infants Hospital, and was house-surgeon at the Victoria Hospital for Children. After working on psychiatry and child guidance at the Maudsley Hospital, she took the D.P.M. and held the post of assistant medical officer at Horton for a year. Her work with a child-guidance fellowship at the Canonbury Clinic was interrupted by the war, and she went to the British Postgraduate Medical School as house-physician to the children's department at Hammersmith Hospital, where she later became obstetric house-surgeon. She still held

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this appointment when she obtained leave to sail with the refugee children.

A colleague writes: Dr. Zeal was capable, intelligent, quick-witted and a first-class clinician, and her combination of psychological and pædiatric experience tended, naturally, to make a good house-physician. But what made her a resident of the first order was her own character. She was thorough and conscientious in a quiet and efficient way which showed no signs of fussiness or lack of proportion. She could do anything with children, and she was always careful to consider the feelings of both patients and relatives. Her sympathy was disciplined by her psychiatric training and she had none of the submissive weakness which sometimes goes with a sympathetic character. She had a healthy vein of firmness, and when she had once made up her mind that she was right she was capable of holding her own. Outside working hours she was a lively and cheerful person and an asset to any collection of residents. She was both liked and respected by everyone who knew her, and it is the loss of people like her which brings home the senseless iniquity of war.

PLENTIFUL OR ESSENTIAL DRUGS

FINAL HINTS TO PRESCRIBERS

BY far the longest of the three categories into which the advisory committee (see *Lancet*, Sept. 14, p. 340 and Oct. 5, p. 432) has divided the items of materia medica commonly used is the group of drugs "which are readily available at present or are regarded as essential." No attempt has been made to distinguish between those which are essential and those included because they are readily available. Chemical products predominate in the list, which is not surprising since most of the vegetable drugs have to be brought to this country by sea, while most of the chemical products are made at home.

The following vegetable substances are, however, included.

Acacia, aloes, aniseed, balsam of peru, belladonna leaves and root, benzoin, camphor, cardamoms, catechu, cinnamon, coca leaves, colchicum corn and seeds, colocynth, colophony, derris, digitalis, dill seed, ephedra, ergot, ginger, hyoscyamus (*niger* and *muticus*), isphagula, kino, male fern, menthol, mustard, nux vomica, opium, quassia, rhubarb (*Rheum palmatum*), scoparium, senna, stramonium, tragacanth, and certain oils: aniseed, cade, castor, cinnamon, clove, dill, eucalyptus, hydnocarpus, peppermint, theobroma and turpentine.

Chemical and mineral substances included are:

Acids: acetic, acetylsalicylic, ascorbic, benzoic, hydrochloric, hydrocyanic, lactic, mandelic, oleic, salicylic and tannic; acriflavine; ammonium carbonate and chloride; amyl nitrite; antimony compounds; arsenic trioxide; barbitone with phenobarbitone and hexobarbitone and their sodium salts; barium sulphate; benzyl benzoate; bismuth (precipitated); brilliant green; bromethol; bromides; calcium salts; carbon tetrachloride; carbachol; Chiniofon; chloral hydrate; chloramine; chlorbutol; chlorinated lime; chloroform; copper sulphate; creosote; cresol; cyclopropane; erythrityl tetranitrate; ether; ethyl chloride; formaldehyde; gold compounds; guaiacol; hexamine; hydrogen peroxide; ichthammol; iodoxylum; iron preparations (ferri percholor., ferri et ammon. cit., ferri carb. sacch., ferri sulph., iron, reduced iron); indicarmine; kaolin; leptazol; magnesium trisilicate; mersalyl; methyl salicylate; neoarsphenamine; nikethamide; paraldehyde; phenacetin; phenol; phenolphthalein; pyroxylin; quinine salts; resorcin; silver nitrate; sodium salts (benzoate, bicarbonate, chloride, nitrite, phosphate and acid phosphate, salicylate and sulphate); sulphanilamide; sulpharsphenamine; sulphur; thymol; trinitrophenol; urea; zinc chloride and sulphate.

The following alkaloids and similar substances are included:

Adrenaline, amylocaine hydrochloride, atropine, benzocaine, cocaine, codeine, diamorphine, emetine, ephedrine, homatropine, hyoscine, physostigmine, procaine, quinidine sulphate, strychnine, theobromine and theobromine sodium salicylate, theophylline, and theophylline with ethylene diamine (identical with Aminophyllin and Euphyllin).

In some cases the names of identical substances are given in the list; this is done for:

Atebrin (mepacrine hydrochloride), Avertin (bromethol), benzedrine (amphetamide), Dial (allobarbitone), Doryl (carbachol), Evipan (hexobarbitone), Medinal (soluble barbitone), Nembutal (pentobarbital sodium), Plasmoquine (pamaquin), Prominal (phemitone), Per-Abrodil (diodone), Yatren (Chiniofon).

The remaining entries are:

Ext. pituitarii liq.; ext. fellis bovini; extract of suprarenal cortex; insulin; injectio hepatis; pancreatin; papain; gelatin; cacao butter; and iodised oil.

It is clearly the view of the committee that no doctor need hesitate to prescribe any of the substances enumerated.

MEDICAL WAR RELIEF FUND

THE object of the fund is the relief of financial distress arising as a direct result of war conditions. The collection of the fund is in the hands of a committee consisting of the officers of the British Medical Association, the presidents of the Royal Colleges of Physicians, Surgeons and Obstetricians, the chairman of the Charities Committee of the B.M.A. and the president of the Royal Medical Benevolent Fund which is coöperating in its distribution. Eligible for relief is any registered medical practitioner who is a British subject and who is domiciled in England, Wales, Scotland, Northern Ireland or the Channel Islands, as well as the wife or other dependant of such practitioner as the committee may determine. Applications for assistance should be addressed to the hon. secretary of the fund at B.M.A. House, Tavistock Square, London, W.C.1. Contributions to the fund should be made payable to the Medical War Relief Fund and sent to Dr. G. C. Anderson, hon. treasurer of the fund, at the same address.

LIST OF SUBSCRIPTIONS RECEIVED UP TO OCT. 7

£72—Honorary staff of the Radcliffe Infirmary, Oxford.
£60—Honorary medical staff of High Wycombe War Memorial Hospital.
50 guineas—Dr. J. C. Matthews (Downton) and Prof. G. Grey Turner (London).
£50—Anonymous.
25 guineas—Sir Thomas Barlow (London), Dr. J. W. Bone (Luton), Sir Maurice Cassidy (London), Dr. H. Guy Dain (Birmingham), Sir John Fraser (Edinburgh), Dr. Thomas Fraser (Aberdeen), Mr. N. Bishop Harman (London), Lord Horder (London), Sir Robert Hutchison (London), Mr. Hugh Lett (London), Sir Ewen Maclean (Cardiff), Dr. W. Paterson (Harlesden), Dr. Henry Robinson (London), Prof. Wm. Fletcher Shaw (Manchester), Mr. H. S. Souttar (London), and Sir Beckwith Whitehouse (Birmingham).
£25—Dr. B. E. A. Batt (Bury St. Edmunds), and Dr. D. G. Greenfield (Rushden).
20 guineas—Viscount Dawson (London), Mr. E. Lewis Lilley (Leicester), and Sir Cuthbert Wallace (London).
15 guineas—Prof. C. F. Illingworth (Glasgow) and Dr. R. Thin (Edinburgh).
12 guineas—Dr. J. A. McClintock (Church Stretton).
10 guineas—Sir Adolphe Abrahams (London), Dr. Janet K. Aitken (London), Dr. F. M. B. Allen (Belfast), Dr. G. C. Anderson (London), Dr. W. Arnott (Oxford), Sir Girling Ball (London), Prof. Seymour Barling (Birmingham), Dr. C. L. Batteson (London), Mr. Victor Bonney (London), Mr. L. R. Braithwaite (Leeds), Sir John Broadbent (Wendover), Mr. L. R. Broster (London), Dr. J. A. Brown (Birmingham), Prof. A. H. Burgess (Cheadle), Sir Farquhar Buzzard (Oxford), Dr. J. I. Cameron (Glasgow), Mr. V. Zachary Cope (London), Dr. R. W. Craig (Edinburgh), Dr. W. Allen Daley (London), Prof. Stanley Davidson (Edinburgh), Mr. Gordon Gordon-Taylor (London), Dr. F. Gray (London), Dr. E. A. Gregg (London), Prof. E. W. Hey Groves (Bristol), Dr. L. L. Hadley (Birmingham), Mr. A. J. C. Hamilton (Inverness), Mr. R. M. Handfield-Jones (London), Mr. W. Sampson Handley (London), Mrs. K. Bishop Harman (London), Colonel W. L. Harnett (London), Colonel L. W. Harrison (London), Dr. W. F. T. Haultain (Edinburgh), General R. Heard (Edinburgh), Dr. N. G. Horner (London), Sir Arthur Hurst (Oxford), Mr. Cecil A. Joll (London), Sir Robert Kelly (Liverpool), Dr. J. F. Lambie (Glasgow), Sir Walter Langdon-Brown (London), Sir Kaye Le Fleming (Wimborne), Dr. L. MacQueen (Glasgow), Dr. G. W. Miller (Dundee), Dr. Egbert Morland (Aylesbury), Sir George Newman (Harrow Weald), Mr. L. E. C. Norbury (London), Mr. W. H. Ogilvie (London), Dr. Gilbert Orme (London), Drs. H. C. and E. A. Campbell Orr (Wolverhampton), Prof. Harry Platt (Manchester), Dr. H. W. Pooler (Ashover), Sir Humphry Rolleston (Haslemere), Mr. A. H. H. Sinclair (Edinburgh), Dr. P. B. Spurgin (London), Colonel H. Letheby Tidy (London), Dr. Agnes F. Turner (Dumfries), Dr. G. de Bec Turtle (London), Mr. H. P. Vellacott (Plymouth), Mr. Cecil P. G. Wakeley (London), Sir James Walton (London), Dr. S. Wand (Birmingham), Dr. Donald Watson (Bradford), Sir Alfred Webb-Johnson (London), Prof. R. J. Willan (Newcastle-on-Tyne), Dr. J. A. Williams (Birmingham) and Sir Charles Wilson (London).

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£10—Dr. T. M. Davie, Dr. E. M. Dimock (Broxbourne), Mr. C. M. Kennedy (Plymouth), Dr. A. V. Ledger (Plymouth), Dr. Colin D. Lindsay (Plymouth), Dr. T. H. G. Shore (Plymouth), Dr. G. Stoddart (London), and Dr. N. E. Waterfield (Little Bookham).

6 guineas—Dr. G. H. McCulloch (Birmingham) and Dr. Cyril Prance (Plymouth).

5 guineas—Dr. P. H. Abercrombie (London), Dr. P. E. Adams (London), Anonymous, Dr. R. H. Balfour Barrow (Winchester), Dr. A. Beauchamp (Birmingham), Dr. A. H. Bradley (Leicester), Prof. E. Bramwell (Edinburgh), Dr. P. Martin Brodie (Edinburgh), Dr. C. Daniels (London), Dr. J. Forrester (Glasgow), Dr. A. Goodall (Edinburgh), Dr. R. G. Gordon (Bath), Dr. F. E. Gould (Birmingham), Dr. F. W. Grant (Jarrow), Dr. J. V. Grant (Birmingham), Dr. K. Harrower (Glasgow), Dr. R. A. Hickling (London), Dr. J. Hutchinson, Dr. L. A. Hutchinson, Mr. A. Jacobs (Glasgow), Prof. R. W. Johnstone (Edinburgh), Dr. R. Y. Keers (Murtle), Dr. J. G. McCutcheon (Glasgow), Dr. Peter Macdonald (York), Dr. A. S. M. Macgregor (Glasgow), Dr. W. F. McLean (Haddington), Prof. C. McNeil (Edinburgh), Dr. H. A. Mason (Derby), Dr. Douglas Miller (Edinburgh), Dr. J. B. Miller (Bishopbriggs), Dr. H. T. Nixon (Liverpool), Dr. R. W. Payne (Plymouth), Dr. A. P. Phillips (Kidderminster), Dr. J. J. Powell (Bristol), Sir D'Arcy Power (London), Colonel A. H. Proctor (London), Dr. W. T. Ritchie (Edinburgh), Dr. E. M. Rooke (London), Dr. F. A. Roper (Exeter), Dr. A. Senior (Thames Ditton), Dr. M. G. Sheldon (Birmingham), Dr. W. B. Silas (London), Dr. Harold Sington (London), Prof. Sydney Smith (Edinburgh), Dr. Herbert Spencer (London), Mr. R. Scott Stevenson (London), Sir Frederic Still (London), Dr. W. E. Thomas (Ystrad Rhondda), Dr. C. B. F. Tivy, Dr. R. S. Tooth (Lewes), Dr. H. M. Traquair (Edinburgh), Dr. H. Ward-Smith (Hereford), Dr. W. N. West-Watson (Bradford), Dr. G. A. Wilkes (Birmingham), Dr. John Young (Edinburgh), and Dr. R. F. Young (Glasgow).

£5—Dr. H. W. Boake (Dorking), Dr. Elizabeth Bolton (London), Dr. W. H. Brown (Glasgow), Prof. E. P. Cathcart (Glasgow), Dr. W. H. Cowper (Kingsbridge), Dr. W. L. Cuthbert (Stirling), Mr. W. McAdam Eccles (London), Dr. T. Watts Eden, Dr. J. C. M. Given (Tunbridge Wells), Dr. T. P. Heffernan, Dr. S. Hunt (Derby), Dr. L. Kilroe (Rochdale), Dr. T. J. Kirkpatrick (Derby), Dr. G. H. Letchworth, Dr. A. Lyndon (Hindhead), Dr. E. McCulloch (Plymouth), Dr. J. J. McMillan (Melrose), Dr. J. Milne (Manchester), Dr. H. B. Milsome (Chertsey), Dr. T. T. P. Murphy, Colonel C. Max Page (London), "Panel of 1273," Plymouth Medical Society, Dr. Mabel Ramsay (Plymouth), Dr. S. M. V. Richardson (Cheltenham), Wing-Commander T. S. Rippon (London), Dr. W. K. Simmonds, Surgeon-Commander J. C. Sinclair, Dr. J. Smalley, Dr. J. E. Square (Plymouth), Dr. W. L. Templeton (London), Dr. C. Thackray (London), Dr. Elizabeth Thompson, Dr. R. Walker, Dr. L. O. Watt, Mr. A. Hedley Whyte (Newcastle-on-Tyne), Dr. P. M. C. Wilmot (Plymouth), and Dr. E. Wordley (Plymouth).

4 guineas—Drs. A. M. and E. M. Ramsay (St. Andrews).

£4—Dr. H. G. Dowler (Gloucester).

3 guineas—Executors of the late Sir Gilbert Barling, Dame Janet Campbell (London), Dr. H. A. Clegg (London), Dr. H. H. Cohen, Dr. R. Creasy, Dr. W. W. Dawson (Wantage), Dr. A. V. Dill (Stroud), Dr. L. G. Glover (London), Dr. A. Gregory (Manchester), Dr. F. A. Hepworth (Saffron Walden), Dr. C. Hill (London), Mr. G. E. Larks, Dr. W. Lyle (Belfast), Dame Louise McIlroy (London), Dr. A. Macrae (London), Mr. A. Mitchell (Aberdeen), Drs. J. N. and O. N. Morris (Devonport), Dr. L. S. Potter (London), Dr. G. C. F. Robinson, Dr. A. C. Sharp (Harrogate), Drs. A. E. Struthers and R. Cochran (Paisley), and Dr. C. M. Young (Rickmansworth).

£3—Surrey Panel Committee in memory of the late Dr. P. V. Fry.

2½ guineas—Sir Henry Brackenbury (Hendon).

2 guineas—Dr. T. T. Apsimon (Bradford-on-Avon), Dr. N. H. Austin, Dr. A. P. Bertwistle (London), Dr. A. J. M. Butter (London), Dr. G. Lissant Cox (Preston), Dr. M. Cutcliffe (Torquay), Dr. Seymour W. Davies (Wirral), Mr. Norman Dott (Edinburgh), Dr. P. J. Filose (Fareham), Dr. R. Howarth, Dr. L. W. Jones (Llanfairpwll), Dr. R. Keene (Lowestoft), Dr. A. W. Kirkham (Southwell), Dr. W. E. Leishman, Dr. L. O. Lindsay, Mr. A. MacRae (Newcastle-on-Tyne), Dr. W. R. Martine (Edinburgh), Drs. Moul and Sinclair (London), Colonel W. S. Murphy (Douglas), Dr. G. S. Nicoll (Exmouth), Dr. F. W. Morton Palmer (Totnes), Prof. R. M. F. Picken (Cardiff), Mr. J. W. G. H. Riddell (Plymouth), Dr. G. B. Scott (London), Dr. F. M. V. Smith, Dr. M. Stein (Ferryhill), Surgeon Rear-Admiral L. Warren (Barrow Gurney) and Dr. R. Gordon Wilbond (Bristol).

£1 5s. 6d.—Dr. C. H. S. Horwitz (London).

1 guinea—Dr. Rosa Bale, Dr. C. D. Branson (Birmingham), Dr. Brown, Dr. G. Chambers, Dr. F. O. Clarke (London), Dr. T. W. Clarke (London), Dr. A. Cox (London), Dr. E. Cretney (Goole), Dr. G. J. G. Davidson (Lichfield), Dr. E. Davis (London), Dr. H. R. M. Denney, Dr. I. F. W. Edwards (Norwich), Dr. W. A. Frost (London), Dr. T. S. Hoy, Dr. W. Irving (Winchester), Dr. D. F. Johnstone (Plymouth), Dr. O. Marriott (Haywards Heath), Dr. A. L. Miles (Caernarvon), Dr. E. L. Monkhouse (Epping), Dr. A. C. Mooney, Dr. G. M. E. Olive (Southall), Dr. G. B. Page (Exeter), Dr. W. W. Shrubshall (Burgess Hill), Dr. S. Smith (London), Dr. Clara Stewart (Leeds), Dr. B. H. Stribling and Dr. S. V. Tinsley (Spennymoor).

£1—Dr. Josephine Heffernan, Dr. J. A. Master (London), Dr. A. Nathan (London), Dr. H. H. C. Reid and Dr. D. A. Richmond (Knutsford).

15s.—Dr. J. Shaw (Smethwick).

10s. 6d.—Dr. K. Davison and Dr. Mary Ross (London).

£20—Collected by Dr. Lorton Wilson (Barrow-in-Furness): Sir Matthew Fell, Dr. J. Livingston, Dr. H. F. Blacklee, Dr. A. E. Thompson, Dr. W. R. Bayne, Dr. P. Farmer, Dr. J. R. Turner, Dr. A. Rankin, Dr. J. C. Miller, Dr. G. E. Plowright, Dr. R. Fothergill, Dr. A. J. Cross, and Dr. L. Wilson.

LOCAL MEDICAL AND PANEL COMMITTEES.—£300—Birmingham; £250—Derbyshire; £200—Nottinghamshire; £150—Hertfordshire; £100—Gloucestershire, Leicestershire, North Riding of Yorkshire, Northumberland and Salop; £100 (stock) Warrington; 50 guineas—Southport; £50—Bedfordshire, Derby, Dorset, East Riding of Yorkshire, Herefordshire, Perth and Perthshire; £45 0s. 7d.—Midlothian; 25 guineas—Gateshead; £25—Caernarvonshire and Rotherham; £21—Rutland; £20—Greenock and Surrey; 10 guineas—Aberdeenshire; £10—Darlington; 5 guineas—East Lothian.

Total—£4282 6s. 7d. and £100 3½% conversion stock.

Notes, Comments and Abstracts

THE PURPOSE OF AUXILIARY HOSPITALS

To increase the hospital accommodation available for air-raid and military casualties and for military sick, the Ministry of Health have arranged that auxiliary hospitals should be established, for the most part in private houses, to receive post-operative, convalescent and other comparatively mild cases. They are to be regarded as E.M.S. hospitals, and at present the Ministry plans to establish ten or so of them in each county, except on the coast, where they will be fewer. In time the hospital officer or group officer will arrange for the main hospitals to be affiliated to certain auxiliaries so that they can send patients there directly. To prevent patients staying longer than is necessary in an auxiliary hospital it is proposed that service patients should not stay there for more than three weeks. At the end of that time, if not fit for discharge to their units or to a convalescent depot they will be sent back to the hospital from which they came. If a patient's medical officer thinks he would benefit by a further period in an auxiliary hospital he can send him back, but in the ordinary way the man will be fit, at the end of his three weeks, to go on to a convalescent depot for those who no longer need active treatment but still are not fit for duty. A depot has been established in each command, and patients may be referred there either directly from the main hospital or from the auxiliary hospital.

No auxiliary hospital will be used for the treatment of patients requiring surgical care unless it has been deliberately up-graded by the hospital or group officer by the allocation to it of additional personnel and equipment. In the ordinary way auxiliary hospitals will be staffed by one or two trained nurses assisted by V.A.D.s and attended by a visiting general practitioner. Those used for civilian casualties, however, will probably take cases requiring rather more treatment than auxiliary hospitals taking service patients, and will therefore receive visits from members of the medical staff of the main hospital; but the period of stay will still be limited to three weeks for each patient unless the visiting officer from the main hospital orders him another three weeks. Auxiliary hospitals will not ordinarily be available for the civilian sick, though this policy may be modified if need arises.

ST. THOMAS'S HOSPITAL

As the result of three direct hits within a week, St. Thomas's Hospital has had to be the first of the great teaching hospitals to be evacuated. The decision to evacuate was taken with extreme reluctance, but the extent of the damage left no choice. Seven of the hospital blocks were entirely out of action, including the entire kitchens, the dispensary, which with all the drugs and dressings in the hospital was gutted with fire, and the emergency operating-theatres which had been constructed at the outbreak of war. In addition the final bomb, striking the centre of the building, completely severed all services such as water, gas and electricity, and it will be at least another month before even a makeshift heating apparatus can be constructed.

In spite of all this, it has been found possible to maintain some services. Full outpatient facilities are available daily, including casualty, X rays, and the V.D. department. A permanent medical and nursing staff is in residence and the honorary staff are attending daily. Fifty beds are being maintained for air-raid casualties in addition to ten beds for emergency civilian sick, and there is also a small maternity unit in which at least one confinement has been conducted each night. Negotiations are in progress with the sector officer to arrange for outpatients who require hospital treatment to be admitted to one or other of the sector hospitals.

AIR-RAID CASUALTIES SURVEYED

IN his statement to the House of Commons on Oct. 8, Mr. Winston Churchill said that when we entered the war we expected air-raid casualties of anything up to 3000 killed in a single night and perhaps 12,000 wounded nightly. We had made hospital arrangements on the basis of 250,000 casualties. The real figures which he gave fortunately do not come up to expectations. Up

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to last Saturday as a result of air-bombing about 8500 people had been killed and 13,000 wounded, and since the heavy raids began on Sept. 7 casualties had declined week by week from over 6000 in the first week to under 3000 in the last week. Though the destruction of property had been considerable it was less than we had expected before the war, and Mr. Churchill was able to announce a step forward in spreading the risk over the property of all classes. The Chancellor of the Exchequer has almost completed the preparation of a bill for nation-wide compulsory insurance against damage to property from the enemy's fire, which will be retrospective. It is also proposed to provide insurance against the risk of war damage for movable properties such as industrial plant and household effects.

AN IMPROVED FACE MASK

Mr. T. W. ADAMS, A.Inst.P., has devised a modification of the face tent for oxygen administration described by Argyll Campbell (*Lancet*, 1937, **1**, 82). The mask is simple in construction and can be fitted and used without previous instruction or experience. As there are no valves there is no resistance to breathing.

The mask is shaped to fit the contour of nose and face; its moulded edge is covered with soft rubber tube, and it is held in position by an elastic band below the ears or by a light metal spectacle frame. The oxygen is conveyed to the mask by chromium-plated brass tubes, one on either side, at the level of the patient's mouth. The lower part of the mask is left open except for a strip of strengthening material. The total weight is about 2 oz. Rubber tubes join the oxygen inlet tubes to a Y piece connected with the flowmeter and oxygen supply. The pressure on the exit side of the flowmeter being very little above atmospheric pressure there is no unpleasant blast on lips or face; even at high rates of flow the movement is perceptible only as a pleasantly cool breeze. The reducing valve is fitted with a fine adjustment control. Any type of flowmeter can be used with the mask, but since there is no need to humidify the oxygen a dry type is to be preferred, such as the "gauge" or the "bobin" or the simple one described by E. P. Poulton (*Brit. med. J.* 1937, **1**, 1113). In an emergency the mask may be connected direct to the fine adjustment valve. Should special circumstances require the oxygen to be humidified it may be bubbled through the appropriate liquid contained in a Woulfe bottle placed between the flowmeter and the mask. The ventilation is sufficient to keep the mask reasonably free from carbon dioxide and to minimise the condensation of moisture on the mask. The mask is made by the Oxygen Tent Service (Medical Equipment Ltd.) of 1a, Beaumont Street, London, W.1, and can be obtained either separately or complete with reducing valve and flowmeter.

RELIEF OF DISTRESS IN CHINA.—We learn from Mr. F. M. Osborn, who is collaborating with Dr. H. Gordon Thompson (late of Shanghai) on behalf of the British Fund for Relief of Distress in China, that there were 20 to 30 responses to the appeal (LANCET, 1938, **1**, 1021) to hospital authorities and medical men for any usable surgical instruments for which they had no further use. After the articles had been looked over and reconditioned they were dispatched to China along with a good consignment of new instruments. It is not possible now, he writes, to procure more new ones owing to other demands, but if any of your readers have any serviceable used instruments, &c., I would be pleased to receive them, have them cleaned, reconditioned and sent out. The Burma road, he adds, has not been closed for Red Cross materials—and anyhow it is soon to be reopened. They should be sent to him at 15, Endcliffe Hall Avenue, Sheffield 10.

Appointments

BEATTIE, MARY, M.B.Belf., D.P.H.: temp. junior asst. M.O. for Nottingham.

WALKER, C. FERGUSON, M.D.Lond., D.P.H.: temp. asst. county tuberculosis officer and R.M.O. at Knightwick Sanatorium, Nr. Worcester.

WALLACE, W. B., M.B.Glasg.: examining surgeon under the Factories Act, 1937, for Lochgelly, Fife.

WEST, R. G. RANYARD, M.D.Lond., M.R.C.P.: junior asst. R.M.O. at Surrey County Sanatorium, Milford, Nr. Godalming.

Medical News

Consultant Scientists

To ensure the continuance of the fullest coöperation of scientific workers with the Government in the national war effort, the Lord President of the Council has appointed a scientific advisory committee. The members are:—

Lord HANKEY, chancellor of the Duchy of Lancaster (chairman); Sir WILLIAM BRAGG, P.R.S.; Dr. E. V. APPLETON, F.R.S., secretary of the Department of Scientific and Industrial Research; Sir EDWARD MELLANBY, F.R.S., secretary of the Medical Research Council; Sir EDWIN BUTLER, F.R.S., secretary of the Agricultural Research Council; Prof. A. V. HILL, F.R.S., physical secretary of the Royal Society; Prof. A. C. EGERTON, F.R.S., biological secretary of the Royal Society.

The terms of reference of the committee are: (*a*) To advise the Lord President on any scientific problem referred to them. (*b*) To advise Government departments, when so requested, on the selection of individuals for particular lines of scientific inquiry or for membership of committees on which scientists are required. (*c*) To bring to the notice of the Lord President promising new scientific or technical developments which may be of importance to the war effort.

London Jewish Hospital Medical Society

Miss Muriel Landau will deliver her presidential address to this society on Oct. 20 at 3.30 P.M. at 37, Mapesbury Road, N.W.2. Members who wish to be present should notify the lay secretary at the hospital, Stepney Green, E.1, not later than Oct. 14.

Medical Society of London

A general meeting of this society will be held at 11, Chandos Street, W.1, on Monday, Oct. 14 at 4 P.M., when Dr. Gordon Goodhart will deliver his presidential address. The title of the address will be Stray Thoughts on Pathology and Medicine.

Course on Industrial Medicine

A fortnight's course on industrial medicine and hygiene will be held at the London School of Hygiene, Keppel Street, W.C.1, beginning on Nov. 11. It is intended for works medical officers, and part-time attendance can be arranged. Further information may be had from the secretary of the school.

Service Casualty

Surgeon Lieutenant T. I. David, R.N.V.R., H.M.S. *Dundee*, has been reported missing, presumed killed.

Births, Marriages and Deaths

BIRTHS

ELLIOTT.—On Oct. 5, in York, to Dr. Lucy Elliott, wife of Captain Charles Elliott, R.A.S.C.—a son.

LONGRIDGE.—On Sept. 29, at Onchan, I.O.M., the wife of T./Major R. G. M. Longridge, R.A.M.C.—a son.

MACIVER.—On Oct. 4, at Weybridge, the wife of Major D. P. MacIver, R.A.M.C.—a son.

NORRIS.—On Sept. 28, at Lincoln, the wife of Dr. F. E. Norris—a son.

PLATT.—On Oct. 4, at Mill Hill, the wife of Dr. B. S. Platt—a daughter.

ROBIN.—On Oct. 5, in London, the wife of Mr. Ian Robin, F.R.C.S.—a daughter.

STEPHENSON.—On Sept. 27, at Maidstone, the wife of Surgeon Lieut.-Commander G. V. Stephenson, R.N.V.R.—a son.

TAYLOR.—On Oct. 1, in Bristol, the wife of Dr. Arthur Taylor—a son.

MARRIAGES

DONALDSON—WHYLEY.—On Sept. 28, Malcolm Donaldson, F.R.C.S., of London, to Mia Whyley, of Bedford.

DURDEN SMITH—PERKINS.—On Oct. 4, at Northwood, Anthony James Durden Smith, M.B., to Dorothy Joan Perkins, M.B.

HAMILTON PATERSON—IM THURN.—On Sept. 28, at Castle Cary, John Hamilton Paterson, M.B., to Ursula Ysabel im Thurn, M.R.C.S.

PETCH—STIRLING.—On Sept. 20, in London, Charles Plowright Petch, M.R.C.P., to Margaret Stirling.

REDMAYNE—JEMSON.—On Oct. 5, in Birmingham, Paul Redmayne to Betty Jemson, M.R.C.S.

DEATHS

LOCKHEAD.—On Oct. 7, in Edinburgh, James Lockhead, C.B.E., M.D. Edin., F.R.C.S.E., late senior medical officer at Gibraltar.

MALLINS.—On Sept. 30, at Farnham, Surrey, Henry Mallins, M.B. Dubl., late surgeon, I.M.D., aged 89.

REID.—On Sept. 27, in London, Robert John Reid, M.B. Edin., D.P.H., chief assistant school medical officer for West Ham, aged 58.

REYNOLDS.—On Oct. 2, at Bournemouth, Leethem Reynolds, M.B. Camb., D.P.H., Lieut.-Colonel, I.M.S. (ret.).

VAWDREY.—On Oct. 2, at East Horsley, Surrey, Theophilus Glascott Vawdrey, M.R.C.S., formerly of Plymouth, aged 89.

WATSON.—On Oct. 1, at Reigate, Surrey, Charles Henry James Watson, M.B. Edin., F.R.C.S.

WEIR.—On Oct. 5, at Brockenhurst, Hants, Hugh Heywood Weir, M.B. Camb., aged 65.

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ORIGINAL ARTICLES

ADHERENT PERICARDIUM
CONSTRICTIVE AND NON-CONSTRICTIVE

BY T. G. ARMSTRONG, M.B. Camb., M.R.C.P.
(*From the Department of Medicine, Cambridge University*)

THE history of adherent pericardium reveals a strange diversity of opinion as to its effects on the heart. Lower (1669), Vieussens (1715) and Boerhaave suggested that adherent pericardium was sometimes the cause of heart failure. Morgagni (1760) stated that it led to absence or weakness of the apex beat, with œdema and ascites. Lieutaud (1767) described 23 cases and gave the chief symptoms as dyspnœa, a small pulse, œdema, and ascites. Corvisart (1818) described 3 cases that died within twelve months of the onset from œdema and ascites. Thus the earliest reliable records laid stress on the "small quiet heart," and on the preponderance of ascites in the clinical picture.

It was not until 1832 that the first claim that adherent pericardium produced enlargement of the heart was put forward by Hope, but the writings of the Broadbents (1895) emphasised this view to such an extent that the profession came to accept cardiac enlargement as the most important, if not the only, effect of the lesion. None the less, in 1842, Norman Chevers had contested this view and on wide experience had written that he had never seen enlargement of the heart associated with adherent pericardium unless there were coincident valvular lesions. He believed that hypertrophy only followed valvular lesions and that pericardial fibrosis, on the contrary, showed a "tendency to be followed by general diminution in the size of the heart and its vessels and contraction of its cavities." In 1845 King gave his view that any hypertrophy due purely to adherence of the pericardium must be inappreciable in degree and devoid of all signs and symptoms.

In chronological order, the following beliefs about the effects of adherent pericardium have thus been expressed.

1. That it may cause a cardiac failure characterised by a small heart associated with œdema and ascites.
2. That it may have no effect at all.
3. That it may cause failure with enlargement of the heart.

In the light of modern knowledge the first two of these beliefs are undoubtedly correct, the third is unproved, and there is considerable evidence to show that it is untrue.

The work of Volhard (1923) and many others (White 1935, Beck 1929 and 1937, Beck and Griswold 1930, Beck and Cushing 1934), has shown that "adherent pericardium," or more properly "pericardial fibrosis," may cause constriction and cardiac compression of which a small heart and ascites are the dominant clinical findings. Thus the first historical view is upheld.

All morbid anatomists are aware that an adherence of the layers of the pericardium may be found at autopsy in patients who have died from intercurrent disease without either cardiac enlargement or cardiac failure. Hosler and Williams (1936a and b) approached the topic from an experimental standpoint and sutured the heart to the diaphragm in dogs that were subsequently given strenuous exercise for 2½ years. In one animal a saccular aneurysm of the right ventricle was caused by the pull on the heart, but no increase in the size or weight of the heart was ever found. They also quoted post-mortem records to show that enlargement of the heart never developed in the absence of valvular lesions or other cardiovascular disorder. These findings are in keeping with a personal series of 114 unselected cases of complete adherence of the pericardium collected from the records of the London Hospital. Extrapericardial adhesions occurred with the usual frequency. In 31 cases there were no symptoms. Enlargement of the heart was present in 72 cases but was invariably associated with rheumatic pancarditis, valvular lesions or other cardiovascular disease which might itself be the cause of cardiac enlargement. These observations show that the second historical view is certainly correct; they throw great doubt on the validity of the third belief.

HISTOLOGY OF ADHERENT PERICARDIUM

It is a striking fact that one pathological process, "adherent pericardium," should be capable of causing two such different effects. It seems that at least two different pathological entities must be at work, masquerading under a single name. What then is the factor that decides whether or not the heart is compressed?

An investigation was made into the histology of the pericardium in cases taken from the series of 114 London Hospital autopsies at which complete adherence of the pericardium had been found; 4 cases of cardiac compression from which the pericardium had been removed at operation were added. The cases were divided into two groups.

1. Adherent pericardium associated with chronic compression of the heart—the "constrictive" group.
2. Adherent pericardium without cardiac compression, the "non-constrictive" group.

Except in the operative cases, the evaluation of these groups was made on the basis both of clinical and of complete pathological evidence. In each case the diagnosis of constrictive pericarditis rested on a sure foundation. The constrictive group consisted of 10 cases, 6 post-mortem, 4 operative; the non-constrictive group consisted of 28 cases, 20 of which were rheumatic and 8 non-rheumatic. The macroscopical and histological appearance of the pericardium in these two groups showed clear and sharply defined differences.

CONSTRICTIVE GROUP

In the constrictive group the pericardium was thicker, denser and tougher than in the non-constrictive group and often large cavities were found containing inspissated caseous debris. In every case in the constrictive group the fibrous tissue had partly or completely undergone a process of hyalinisation. In all the 6 autopsy cases and in 2 of the operative cases this process was complete in the sections available for microscopy and the whole section was composed of hyaline fibrous tissue. In the other 2 operative cases the hyaline tissue was only patchy in distribution, but where it was not present the individual collagen fibres were seen to be much thicker and the fibrous tissue much more compact than its counterpart in the non-constrictive series. The general appearance of the tissue was more like fibro-cartilage than normal granulation tissue. The individual collagen fibres were closely bound together and of enormous thickness. They were swollen and structureless and presented a glassy translucent appearance without internal architecture. Their size contrasted strongly with the slenderness of the fibres in the non-constrictive group. The fibres ran, for the most part, parallel to one another, but in some sections a closely interlacing system of dense whorls was seen. The tissue was usually lacking in vessels, particularly capillaries, but in a few cases relatively large vessels were seen in small numbers. Typically the tissue was avascular and in this respect again contrasted strongly with the non-constrictive group. A single case showed some infiltration with polymorphonuclear leucocytes which suggested that a subacute septic inflammation was at work. In all the other cases there was no cellular infiltration, and apart from a few linear nuclei on the outside of the hyaline fibres the tissue was almost entirely acellular. Relatively large cavities were found containing old caseous debris often hæmorrhagic in type, and showing many spaces that had been the resting place of cholesterin crystals.

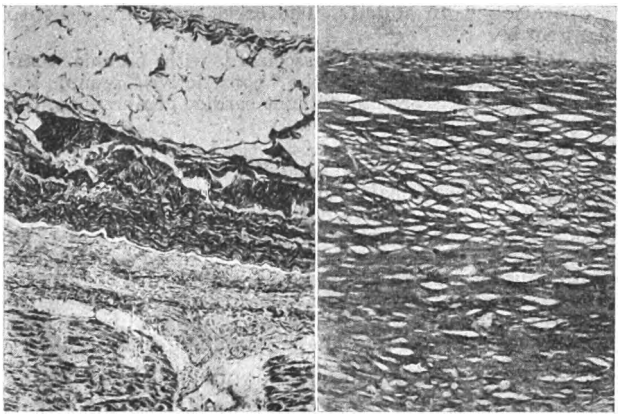
Of the 10 cases 8 showed calcification; this was present either in the form of multiple small nodules in the almost cartilaginous matrix or as plates over its surface or in the walls of the cavities. True bone formation had occurred in one instance. All sections were stained by the Gram and Ziehl-Neelsen methods, but no tubercle bacilli or other bacteria were found in the sections. Complete healing had taken place and had been succeeded by hyaline degeneration; no trace of the original inflammation (except in 1 case) was

apparent. The appearances presented by all these cases was that of the end-results of a widespread and devastating inflammation with great destruction of tissue, often right down to the surface of the myocardium itself.

NON-CONSTRICTIVE GROUP

By contrast, in the non-constrictive group the histological picture in the pericardium was a typical one of inflammation and healing. Out of the 28 cases, 2, both non-rheumatic, showed calcification and hyaline fibrosis, but in one it was only localised and could not have been expected to interfere with the heart, while in the other it was too thin (less than 1 mm.) to exert any effect. All the remaining cases were true to the following description.

The area of fibrosis was much thinner and less dense than in the constrictive group. The fibrotic pericardium was highly vascular and even the oldest tissue contained



A B

Histology of the pericardium in the constrictive and non-constrictive groups. Low power. Identical magnification. A. Non-constrictive group. Chronic rheumatic pericardial fibrosis. Note the slenderness of the fibres. B. Constrictive pericardial fibrosis of unknown ætiology. The upper part of the section shows a cavity containing caseous debris. Note the much greater thickness of the scar-tissue than in A.

many capillaries. There was considerable cellular infiltration consisting of lymphocytes, fibroblasts and epithelioid cells. The collagen fibres, especially in areas of old longstanding fibrosis, were fine and delicate and often thrown into waves. There was a crinkly appearance which gave the impression that considerable slack could be taken up in stretching and that if the tissue were subjected to tension it would break or pull out like a thread of wool. The individual collagen fibrils were very slender and never achieved the enormous size of the hyaline type found in the constrictive group. The difference between the two types is well seen in the photomicrographs A and B, which are representative of the two groups. The magnification in each illustration is the same, so that a comparison can be made both of the thickness of the fibrotic pericardium and of the individual fibrils.

DISCUSSION

It seems reasonable to conclude that in constrictive pericarditis the compression of the heart depends on the type of fibrous tissue present and on its thickness and density. Without fibrosis of this type there will be no compression of the heart, but it must not be assumed that when this dense tissue is present cardiac compression will result. To ensure compression it must be present in a suitable situation, for calcification of the pericardium has sometimes been noted either during life or at the autopsy table in patients in whom there had been no impairment of the heart's function (Vilvandré 1930).

Beck and Cushing (1934) in their description of surgical and autopsy cases of constrictive pericarditis describe h yalinisation as present in 3 of their 6 cases; in the remaining 3 it is not mentioned and so cannot be excluded. Beck and Griswold (1930) in their experimental cases following pericardial irrigation with Dakin's fluid found hyalinisation of the pericardial scar in dogs which gave the fully developed picture of chronic pericardial compression.

The histological picture in the two groups shows clearly that the density and toughness of the fibrous tissue is the deciding factor in producing cardiac compression. It explains in addition the great success of the operation of pericardectomy. The removal of an adherent pericardium will necessarily lead to further adhesions in healing, and if these were the cause of the original disability it would not be expected that operation would remove them. The reason for the success of this operation is that the peculiar fibrous tissue which compresses the heart does not repeat itself in the process of healing. When adhesions form, as indeed they will, they are of the normal kind and have no effect on the heart.

The different histological appearances in the two groups suggest also a difference in ætiology and explain the widely held clinical view that cardiac compression never follows a rheumatic pericarditis. The end-results of rheumatic inflammation are never such as have been described in the constrictive group, and the fibrous tissue formed is not such as would be expected to cause cardiac compression. It is a much less flagrant inflammation and is unaccompanied by great destruction of tissue or by caseation or hyalinisation. On pathological grounds as well as clinical, therefore, rheumatism can be excluded from the ætiology of constrictive pericarditis.

Positive evidence of the ætiology is more difficult to find. The inflammation described is identical with the end-results of tuberculosis and cannot be differentiated from it with the microscope. One case only in the present series was proved to be due to tubercle. In this case no bacilli could be demonstrated but typical tubercles were seen and a caseous gland was found to be adherent to the fibrotic pericardium. A second case, not included in the series because no autopsy was obtained, was also tuberculous in origin. This was a man who died from cardiac compression five years after a pericardial effusion from which tubercle bacilli were isolated during the acute phase. Tuberculosis can be accepted with certainty as one of the causes of constrictive pericarditis and indeed many such cases are already on record. Probably many more cases are of tuberculous origin than can be proved by histological or bacteriological methods.

The evidence is scanty, but it is probable that some cases are the end-result of a septic pericarditis.

Nigst (1934) records the case of a man who developed chronic cardiac compression during convalescence from a severe cellulitis of the leg and osteomyelitis of the femur. His abdomen was tapped 250 times in fifteen years! At autopsy the full picture of constrictive pericarditis was seen, including dense pericardial fibrosis with calcification. An acute pericarditis must have occurred soon after the infection of the leg but as it passed unnoticed clinically the bacteriological diagnosis was never established. It is likely, however, in view of the osteomyelitis, to have been due either to a staphylococcus or to a streptococcus.

Some evidence can be advanced from veterinary pathology in favour of septic pericarditis as a cause. Joest (1926) states that foreign bodies are commonly ingested by cows and after ulcerating through the reticulum and diaphragm come to rest in the pericardial sac where a septic inflammation may be set up. He describes in the following words the late results of this process, and also of septic pericarditis arising in other ways:

"The adhesions contain hyalinised tissue with unabsorbed fibrin in which later calcium may be laid down in the form of nodules or plates. If the condition is sufficiently widespread these may result in an armouring or girdle of chalk completely surrounding the heart. Very rarely actual bone formation may occur." And again, "The absorption of purulent exudate progresses very slowly and is often incomplete, so that it may lead to adhesions either of coagulated material or of granulation tissue, giving rise to caseous masses which may later calcify and be mistaken for tuberculosis."

The similarity between the end-results of this septic pericarditis in cows and constrictive pericarditis in man hardly needs emphasis.

SUMMARY AND CONCLUSIONS

Adherent pericardium may lead to cardiac failure associated with a small heart (constrictive type) or may

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have no effect on the heart at all (non-constrictive type). There is no evidence that it causes enlargement of the heart unless it is accompanied by valvular or other cardiovascular disease.

The pathology of the two types shows well-defined differences, the deciding factor in producing constriction being the density and toughness of the fibrous tissue.

The constrictive type is never rheumatic; it has been known to be tuberculous, and has probably resulted in some cases from an unrecognised septic pericarditis.

This work was carried out during the tenure of a post-graduate fellowship of the Medical Research Council. I wish to thank Prof. H. M. Turnbull for the facilities of the Bernhard Baron Department of Pathology, without which this work could not have been carried out.

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TRUE CHYLOUS PLEURISY

REPORT OF A CASE

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D. A. Slade, M.R.C.S.
ASSISTANT PATHOLOGIST TO THE INFIRMARY

THE cisterna chyli and thoracic duct are not uncommonly invaded by new growth, the primary tumour in a third of the recorded cases being in the stomach. In the case described below, however, the growth was a retro-peritoneal sarcoma invading the psoas muscle (fig. 1). Where the thoracic duct enters the subclavian vein there was an organised and partially canaliculised clot, about 1 in. long, in which tumour cells were found (figs. 2 and 3). There was no evidence that the cisterna chyli was involved, or that there was continuous permeation from tributary lymphatics. Widespread embolic dissemination was not seen by the naked eye, the lungs being apparently clear, but the changes induced in the circulation of lymph probably determined the location of secondary growth in the supraclavicular glands. This case illustrates well the fact, originally pointed out by Bland-Sutton, that obstruction or even surgical ligation of the thoracic duct does not interfere with nutrition, in this way differing from a permanent fistula of the duct; for in the former instance the chyle is able to enter veins

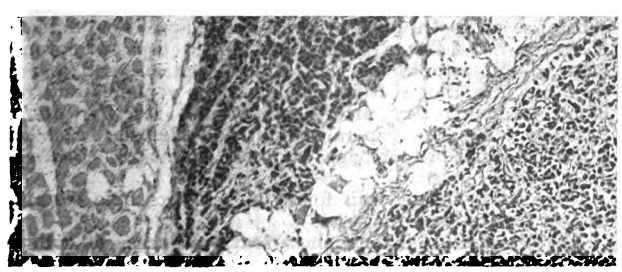

FIG. 1—Growth invading psoas muscle—large round-celled sarcoma. (× 60.)

FIG. 2.—Subclavian vein with tumour growth marked T. (× 18.)

by collateral routes. This case was one of true chylous pleurisy, as the chemistry shows, and not due to the degeneration products of tumour growth.

CASE-RECORD

The patient was a woman, aged 59, in the Royal Infirmary, Sunderland, with ten weeks' history of a small and slightly painful swelling in the left posterior triangle of the neck. This was followed three weeks later by a small painless lump over the anterior ends of the left fourth and fifth ribs. Soon afterwards dyspnœa and intermittent dry cough began. The dyspnœa and weakness gradually increased, ending in death ten weeks after the onset of the first swelling in the neck. The only previous illnesses were intermittent attacks of cholecystitis.

On admission there was no obvious wasting and only slight anæmia. Orthopnœa and slight cyanosis; pulse-rate 80–120, regular. Superficial discrete small hard glands attached to the skin in the left posterior triangle of the neck, left supraclavicular region, and upper part of the sternum. A relatively painless mass of hard matted glands, the size of a small orange, deep in the left posterior triangle. Slight tenderness and muscular rigidity in the right epigastric region.

The chest showed signs of extensive bilateral effusion only. Two days after admission 43 oz. of milky fluid were withdrawn

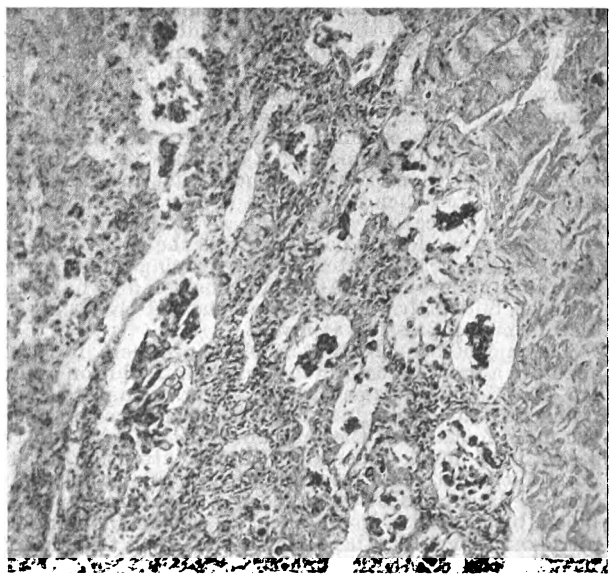

FIG. 3—High-power view of area marked in fig. 2, showing tumour cells in clot with duct canalisation.

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from the right pleural cavity, and 27 oz. from the left. Paracentesis was discontinued owing to distress and deterioration of the patient's condition, ending in death four days later. The illness was afebrile until the last three days when there was slight intermittent pyrexia. The urine contained urates only.

Pleural effusion.—A milky fluid with some pink sediment and a few clots; opacity not reduced on centrifuging. Reaction alkaline; specific gravity 1·022. Centrifuged deposit contained numerous small lymphocytes, some red blood-cells, and large mononuclear cells. No globules of fat visible with the ⅙ objective. No organisms found; cultures sterile.

Chemical analysis: dextrose 0·07%; total fats 1·92% by weight (of these only a trace were neutral, the remainder being fatty acids); cholesterol a trace only; lecithin a trace only (the patient was on a low-fat diet); total protein 18·2%; nitrogen 0·025%; urea 46 mg. per 100 c.cm.; serum albumin 13·5%, serum globulin 0·83%.

Necropsy.—The body was not emaciated. Abdomen contained a small quantity of straw-coloured free fluid in the peritoneal cavity. The gall-bladder was fibrotic, contained many small faceted stones, and was surrounded by a large mass of new growth connected with a similar irregular hard mass in the lesser omentum. A large matted mass of tumour was situated over most of the posterior abdominal wall, surrounding the blood-vessels and invading the pancreas, psoas and iliacus muscles, and mesentery. Nothing else abnormal was found in the abdomen.

Each pleural cavity contained about two pints of milky fluid. The lungs appeared normal, apart from terminal congestion. The mediastinum appeared to be free from growth. The thoracic duct was a little thickened but not dilated; no leak was demonstrated in either the duct or its tributaries. The heart was fatty. A large mass of hard matted glands filled the left posterior triangle, both superficial and deep, and some small hard superficial glands were found in the subclavicular region, especially on the left, extending to the fifth ribs. The tissues were much indurated where the thoracic duct entered the subclavian vein, the duct dividing terminally into three branches, all entering close together. At their site of entry the subclavian vein contained an organised clot about 1 in. long, firmly adherent to the wall of the vein and partially occluding its lumen. A probe could, with difficulty, be passed along the tributaries of the thoracic duct into the clot but not quite into the vein.

The patient was under the care of Dr. M. Hickey outside the hospital and Dr. Hamilton Ross and Dr. Bruce Low in the hospital, to whom we are indebted for these notes.

BLAST FROM HIGH EXPLOSIVE

PRELIMINARY REPORT ON TEN FATAL CASES

BY

GEOFFREY HADFIELD JOAN M. ROSS

R. H. A. SWAIN JEAN M. DRURY-WHITE

PATHOLOGISTS IN THE E.M.S.

With a note on the

IDENTIFICATION AND ESTIMATION OF CARBOXYHÆMOGLOBIN IN FORMOL-FIXED MATERIAL

BY ARTHUR JORDAN

CHEMICAL PATHOLOGIST IN THE E.M.S.

DURING the last few weeks we have carried out post-mortem examinations on ten civilians who had died suddenly or in a few hours after short-range exposure to the detonation of high-explosive during aerial bombardment. In all cases circumstantial evidence pointed to death being due to "blast." In all but one case gross traumatic lesions were either completely absent or of trivial degree.

It is established beyond reasonable doubt that sudden death without gross trauma may result from the impact against the body of the violent, rapidly moving wave of high atmospheric pressure set up in the immediate neighbourhood of an explosion. Five of our cases we believe to have died from the effects of "blast," intrapulmonary capillary hæmorrhages being the only gross anatomical lesion common to them all. In three cases, considered from circumstantial evidence to be cases of blast, further investigation showed that in addition to the lung lesion, each had such a degree of saturation of the blood by carbon monoxide as to leave no doubt that carbon-monoxide poisoning was the cause of death. Two cases were extricated from overlying debris They were uninjured and at first were considered to have died of blast, but further examination showed that they had died from compression asphyxia.

The mechanism by which blast produces its grave effects is a problem calling for immediate solution and we are at present engaged in its study. Our objects in publishing this preliminary report are to place on record the main features of the pulmonary lesion found in this series, and more especially to call attention to the possibility that cases resembling those due to blast may show a dangerous or grave degree of saturation of the blood by explosion gases such as carbon monoxide or nitric oxide, whilst others showing no gross trauma may have died from compression asphyxia.

Most of the post-mortem examinations were carried out under difficult conditions and immediate spectroscopic examinations of the blood were not always possible. In these cases the blood expressed from the lung after fixation in formol saline was examined by Dr. A. Jordan with the Beck Hartridge reversion spectroscope. Control experiments were carried out to determine whether formalin fixation interfered in any way with the identification of carboxyhæmoglobin or with the estimation of its relative concentration. The details of these experiments are reported separately at the end of this paper. They showed that the identification of carboxyhæmoglobin in blood expressed from lungs which had been fixing in formalin for two to three days presented no difficulty, but that, since there was a relatively slow conversion of carboxyhæmoglobin into methæmoglobin, the estimation of the percentage saturation of carboxyhæmoglobin gave figures which were lower than the actual saturation present during life.

CASE-REPORTS

Case 1.—Man, aged 45. Found dead in public shelter which sustained a direct hit by a bomb. Hypostasis pink. Blood in nares and mouth. No external injuries. Blood-stained frothy mucus in the upper air-passages.

Lungs: abnormally pink, generally congested and anthracotic; irregular hæmorrhagic areas scattered through both lungs; no areas of collapse. *Heart:* right side contained friable clot; fluid blood in pulmonary artery; valves normal; post-mortem staining of intima of great vessels. *Brain:* no gross abnormality. *Other organs:* normal.

Carboxyhæmoglobin not present on spectroscopic examination of formol-fixed material.

Microscopically.—Post-mortem autolysis. Lungs show considerable degree of chronic bronchitis and emphysema with heavy deposits of carbon. In the hæmorrhagic areas there is over-distension and rupture of some alveoli and free capillary bleeding over wide areas.

Case 2.—Man, aged 81. Survived ten hours after rescue from bombed shelter. Rigor mortis but no hypostasis. No evidence of external injury. Frothy blood-stained mucus in upper air-passages.

Lungs: congested but no subpleural hæmorrhages; considerable degree of chronic bronchitis and emphysema. Areas of hæmorrhage of varying size and irregular shape into substance of both lungs. Massive collapse not detected. *Heart:* gross atheroma of mitral and aortic cusps and coronary artery; hypertrophy of wall of left ventricle and scarring from old infarction; friable clot in right ventricle and fluid blood in pulmonary artery. *Kidneys:* scarring due to vascular disease; generalised athero-sclerosis. *Stomach:* a few petechial hæmorrhages on lesser curvature. *Brain and other organs:* normal.

No carboxyhæmoglobin found on spectroscopic examination of formol-fixed material.

Microscopically.—Lungs show scattered areas of collapse, and free escape of red blood-corpuscles into the alveoli in the region of the hæmorrhages with mild, early polynuclear infiltration. Hæmorrhage into walls of some bronchioles.

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Case 3.—Man, aged 40. Found dead in public shelter which sustained direct hit by a bomb. Well nourished; hypostasis pink. Contused wound on skin and fingers of right hand; no other injury. Blood running from anterior nares.

Frothy blood in *trachea* and *bronchi*. *Lungs:* extremely congested, especially lower lobes; this general congestion made it impossible to identify any well-defined areas of recent hæmorrhage. *Heart:* normal size; valve cusps healthy; aorta stained bright red. *Digestive system* normal except for hyperæmia of areas of small intestine and two small areas of subperitoneal hæmorrhage on surface of two coils of intestine. *Other organs*, including *brain*, normal macroscopically.

At least 50% of total blood pigment present in blood expressed from lung after formalin fixation was carboxyhæmoglobin.

Microscopically.—Both lungs show free intra-alveolar capillary hæmorrhage over wide areas. For the most part hæmorrhages are deeply placed, but there are scattered areas of subpleural extravasation.

Case 4.—Girl, aged 13. Found dead in a public shelter which sustained direct hit by a bomb. Well covered, normally developed girl. Blood-stained frothy fluid coming from the nose. Hypostasis pink.

Frothy blood in *trachea* and *bronchi*. *Lungs:* posterior parts, deep purple; both lungs very congested with macroscopic areas of hæmorrhage, varying in size from 1·5 to 2 cm. across, throughout the substance, a few being subpleural. All *other organs* normal macroscopically.

At least 65% of total blood pigment present in fluid expressed from lung after formol-fixation was carboxyhæmoglobin.

Microscopically.—Outstanding change in lungs is capillary hæmorrhage into alveoli, massive in some of deeper parts of lung but present to lesser degree in subpleural areas. Also acute over-distension of respiratory bronchioles, atria and alveoli. At periphery of lung this acute emphysema has caused splitting of pleura with formation of microscopic bullæ. Some arterioles contain abnormal proportion of white blood-corpuscles, mostly polynuclear. Brain shows few free red corpuscles in pia, otherwise tissue is normal. Kidneys, liver and spleen show post-mortem changes only.

Case 5.—Woman, aged about 40. Found dead in a house demolished by a bomb. Obese. Hypostasis bright pink. Slight bruising of upper arms posteriorly. No other external marks of injury. Frothy mucus in mouth and upper air-passages.

Lungs: normal size with emphysema at margins; general congestion with some small scattered areas of hæmorrhage. *Heart and great vessels:* normal; post-mortem staining of interior of vessels. *Stomach and small intestine:* hyperæmic. *Liver, spleen, kidneys and brain:* normal.

At least 75% of hæmoglobin derivatives present in fluid expressed from fixed lung was carboxyhæmoglobin.

Microscopically.—Lungs show over-distension of alveoli with considerable amount of œdema; a few small areas of hæmorrhage in deeper parts. No subpleural hæmorrhage but pleura shows splitting and bulla formation in relation to the over-distended alveoli.

Case 6.—Woman, aged about 29. The mother of the child in case 7, whom she is said to have been holding in her arms. Found dead in a bombed house. Well-nourished. Superficial contusion of scalp and multiple lacerations of legs, arms and thighs. None of these injuries were severe or extensive. Surgical emphysema of tissues of neck, mediastinum and pericardium, and blood in tissues of mediastinum. Fracture of base of skull across sphenoid bone, with slight contre-coup injury in right occipital lobe of brain.

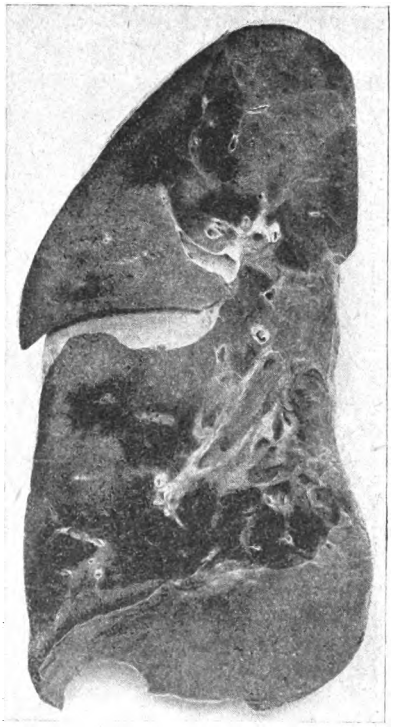

FIG. 1—Cut surface of lung in case 4, showing distribution of hæmorrhages which are most extensive in the deeper parts.

Both *lungs* showed some chronic emphysema and ill-defined areas of recent hæmorrhage with surgical emphysema of roots. *Other organs:* normal.

No evidence of carboxyhæmoglobin in fluid expressed from formol-fixed lung.

Microscopically.—Lungs show many areas of alveolar over-distension with associated hæmorrhages. These are mainly in deeper parts of lung though some are subpleural. In some regions there is hæmorrhage into very small bullæ on pleural surface. No evidence that these areas of pleural damage are in any relation to the ribs.

Case 7.—Male child, aged 1 year 10 months. Said to have been in mother's arms (case 6) when house was bombed. Well-nourished. Small contused and splinter wounds on left side of face, head, both legs and anterior surface of chest. Two small punctured wounds on chest, one of which had penetrated chest wall. Parietal pleura had not been opened.

Trachea and *bronchi* contained frothy blood; mucous membrane hyperæmic. *Lungs:* large areas of hæmorrhage in lower lobes posteriorly; small areas of hæmorrhage in

FIG. 2—Microphotograph of pleural surface of lung in case 4, showing acute vesicular over-distension and microscopic bulla formation on pleural surface.

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both upper lobes and in middle lobe on right side. Surgical emphysema of *pericardium*. *Heart:* normal. *Stomach:* ruptured. Small areas of emphysema in upper part of *peritoneum*. *Liver:* normal, except for few small hæmorrhages posteriorly. *Other organs:* normal.

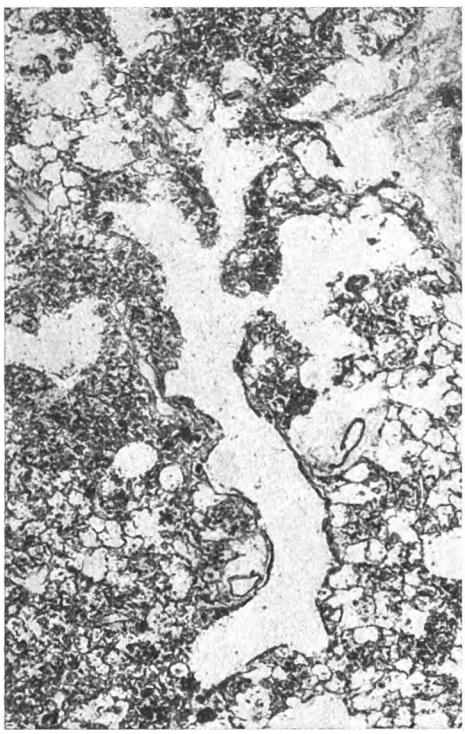

FIG. 3—Low-power view of lung in case 7, showing over-distension of respiratory bronchiole, infundibulum, and atria and alveolar hæmorrhage.

No evidence of presence of carboxyhæmoglobin in fluid expressed from formol-fixed lung.

Microscopically.—Lungs show acute vesicular over-distension with splitting of pleura and bulla formation in places. Massive hæmorrhage into alveoli, more severe in deeper parts of lung.

Case 8.—Man, aged about 50. Picked up dead in open 20–30 yards from large bomb crater. Bruising of left thigh and small lacerated wound of left elbow. Slight bruise on scalp in right frontal region. Fracture of spine between 5th and 6th cervical vertebræ with tearing of anterior ligaments; extravasation of blood into, and tearing of, anterior ligaments in lumbar region. Frothy blood-stained fluid in upper air-passages.

Lungs: slight hæmorrhage into anterior margins where there was chronic emphysema; old pleural adhesions at right apex with tuberculous scarring and recent acute extension of tuberculosis; recent acute tuberculous bronchopneumonia in left lung; few areas of hæmorrhage in both lungs on posterior aspect. *Heart:* old pericardial adhesions; slight atheroma of coronary vessels and some fibrosis of the myocardium. *Other organs*, including *brain*, normal.

No carboxyhæmoglobin found on spectroscopic examination of fresh blood.

Microscopically.—Acute lymphatic spread of tuberculosis from the old scar at right apex and acute tuberculous bronchopneumonia in left lung. Compensatory emphysema. Some hæmorrhage present but chronic disease is advanced and the relationship of the hæmorrhage to recent injury is difficult to assess.

The girls in cases 9 and 10 were found together in bed in a ground-floor room. A bomb had burst immediately outside the window. Both girls were buried under debris and one was stated to have been just alive when the debris was removed an hour after the explosion.

Case 9.—Girl, aged 17. Well-developed. Slight cyanosis present. No external marks of injury. Frothy fluid about the mouth. Frothy fluid in upper air-passages.

Lungs: normal size; hæmorrhages on pleural surface at anterior margins; some hæmorrhage into deeper parts. *Heart:* subpericardial petechiæ posteriorly; otherwise normal. Some congestion of *brain* but *other organs* normal.

No carboxyhæmoglobin found on spectroscopic examination of fresh blood.

Microscopically.—Lung shows congestion and some œdema. Over-distension of alveoli only at pleural surface. Little hæmorrhage into alveoli; fibrin formation in extravasated blood where present. Hyaline thrombi demonstrable in some of smaller vessels. Increased number of polynuclear leucocytes present in some vessels.

Case 10.—Girl, aged 14. Well-developed. Slight abrasions on outer side of left forearm and back of left hand. Slight bruising of scalp over frontal region. Slight cyanosis. Frothy fluid about the lips.

Lungs: dark and congested at both bases; some hæmorrhages and emphysema on pleural surface which in one area corresponded to the position of a rib.

No carboxyhæmoglobin found in fresh blood examined spectroscopically.

Microscopically.—Lungs show congestion and œdema. Little over-distension of alveoli. Some fibrin present in alveolar hæmorrhages. At the pleural surface corresponding to the "rib mark" there is subpleural hæmorrhage and rupture of underlying alveoli with formation of bullæ, some containing red blood-corpuscles. In the dilated blood-vessels at the base there is an increased proportion of polynuclear leucocytes and small hyaline thrombi are present.

DISCUSSION

In each of these ten cases some degree of capillary hæmorrhage into the lung was found. In the two cases in which death was considered to be due to compression asphyxia the hæmorrhage was relatively slight, but the capillary and venous congestion and œdema present were striking and the air-passages contained only a small amount of blood-stained fluid which was not "frothy." In the four cases in which death was considered to be due entirely to the effects of blast there was free capillary bleeding over large areas in which the respiratory bronchioles, atria and alveoli showed uniform and considerable over-distension. It is however, not quite clear that the hæmorrhage is the result of the rupture of alveolar walls previously and acutely dilated, for acute vesicular and interstitial emphysema is present in those parts of the lung which are free from hæmorrhage.

Subpleural hæmorrhages were not conspicuous in any of the cases in which death was presumably due to blast and the only case in which hæmorrhagic rib-markings were present in the pleura died from compression asphyxia. Hæmorrhage into the walls of smaller bronchioles was occasionally found but there was a conspicuous absence of bleeding into the walls of air-tubes larger than this. There was no suggestion that the hæmorrhages were grouped around the bronchial system. The microscopic subpleural bullæ appear to be produced by the detachment of the visceral pleura and its subjacent elastic tissue from the underlying lung by air escaping from ruptured alveoli. The most severe pulmonary hæmorrhages were found in case 7, an infant, and in case 4, a child of 13. The lesser rigidity of the young thoracic wall may therefore be the determining factor in the production of extensive pulmonary hæmorrhage. On the other hand, the hæmorrhages were minimal in the only case which was noticeably obese. As a general rule there was no fibrin formation in the blood extravasated into the alveoli. Clotting was detected in case 2 which survived for ten hours and in the two cases of compression asphyxia; in these three a considerable number of the smaller vessels contained hyaline thrombi.

The three cases in which there was a grave degree of saturation of the blood with carbon monoxide are of particular interest. Each showed pulmonary hæmorrhages of the same character as those found in the cases dying of blast alone. The most striking single difference between the two groups was the fresh pink colour of the hypostasis in the carbon-monoxide cases. In both groups the air-passages contained much frothy serous fluid. It appears that in all the carbon-monoxide cases the patient had sustained a severe degree of blast before inhaling explosion gas.

The amount of blood extravasated into the lung varied considerably, and for this reason, even taking into account the rapidity of production of the hæmorrhages, we do not consider that the pulmonary injury itself could fatally embarrass the circulation. We regard this lesion as a trustworthy indication that the patient has been struck at close range by a wave of high-pressure. It seems more likely that blast produces death by interfering with some vital tissue or centre in which, from the extreme rapidity of action, structural changes are unlikely to be found.

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Identification and Estimation of Carboxyhæmoglobin in Formol-fixed Material (Dr. Jordan)

Carboxyhæmoglobin was found in the formol-fixed material of three of the cases, the proportion of the total blood pigment present as carboxyhæmoglobin being 50, 65 and 75%. The other pigments found were methæmoglobin and oxyhæmoglobin. It was obviously essential to investigate the effect of formol on the spectroscopic identification of carboxyhæmoglobin.

Preliminary qualitative experiments showed that formalin slowly converted oxyhæmoglobin and carboxyhæmoglobin into methæmoglobin. It was then necessary to eliminate any error which might arise in the estimation, by the reversion spectroscope, of carboxyhæmoglobin in mixtures of this pigment with methæmoglobin and oxyhæmoglobin. The alpha band of

OBSERVED WAVELENGTH (IN Å) OF *a* LINE OF OXY- OR CARBOXY-HÆMOGLOBIN IN MIXTURES WITH NEUTRAL FORMOL

Pigment and neutral formalin	Immediately	After			
		1 day	2days	3 days	4days
Carboxyhæmoglobin ..	5730	5743	5751	5764	5767
Oxyhæmoglobin	5774	5781	5775	5780	5786
Mixture of carboxy- and oxy-hæmoglobin ..	5750	5747	5754	5759	5764

carboxyhæmoglobin has a wave-length of 5720 Å. The band of methæmoglobin, wave-length 5795 Å, is too weak to cause much appreciable displacement, and it might be expected that the estimated amount of carboxyhæmoglobin would be greater than the real amount. It was therefore necessary to establish experimentally that the rates of change of oxyhæmoglobin and carboxyhæmoglobin into methæmoglobin were similar, so that no apparent rise in the carboxyhæmoglobin content could take place.

The spectroscopic picture showed a slow disappearance of the oxy- and carboxy-hæmoglobin (see table).

These figures suggest that the rates of conversion of carboxyhæmoglobin and oxyhæmoglobin into methæmoglobin are much the same.

It was found that the rate of formation of methæmoglobin varied considerably with the degree of access of the mixture to air. In specimens exposed to the air in layers 0·2 in. thick the change was complete within 24 hours, while in tubes filled with fluid and well corked the change was considerably slower. It follows that carboxyhæmoglobin in formol-fixed material will change into methæmoglobin at a rate depending on the ease of access to air. The values found for the carboxyhæmoglobin content represent minimal values.

The formalin used in fixing the specimens was neutral and the hæmoglobin derivatives would eventually have undergone total transformation into methæmoglobin. If formalin which had been allowed to become acid had been used the detection of carboxyhæmoglobin would have been complicated by the presence of acid hæmatin.

SUMMARY

Of ten fatal cases considered to have died from blast nine showed no fatal injury. In three a fatal degree of saturation of the blood with carbon monoxide was found. In two the cause of death was compression asphyxia.

The pulmonary lesion from fatal blast is described and its mechanism briefly discussed.

MEDICAL DEFENCE UNION: ANNUAL REPORT.—At its fifty-fifth annual meeting on Sept. 24 Mr. E. D. D. Davis (treasurer) took the chair in place of Surgeon Rear-Admiral E. Pearce Gould (president), deceased. In presenting the annual report Mr. Davis mentioned that more new members had come in last year than ever before. He referred to the distinguished service rendered by the late president and to the loss sustained by the union through his death. For the ensuing year Dr. Henry Robinson, Miss E. Bolton, Mr. Davis and Colonel St. J. D. Buxton, R.A.M.C., were elected members of council. Later Colonel Buxton was chosen as president.

ALCOHOL INJECTION OF THE GASSERIAN GANGLION FOR MIGRAINOUS NEURALGIA

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ALCOHOL injection for paroxysmal trigeminal neuralgia (tic) has now become a standard method of treatment, and though lasting cures from injection of the separate nerve trunks are uncommon yet if the gasserian ganglion is properly injected through the foramen ovale the results are likely to be as permanent and complete as those of surgical resection of the sensory root.

CLINICAL PICTURE OF MIGRAINOUS NEURALGIA

Since 1912 I have used the term migrainous neuralgia to describe a form of migraine or unilateral headache which mostly affects the front of the head on one side around the eye, temple and upper jaw, occasionally spreading to the back of the head, and only rarely to the lower jaw. I have seen a considerable number of these cases, which differ from ordinary migraine in the absence of the preliminary warnings of visual spectra, hemianopia, tinglings of lips and tongue or hand; and the rarity of nausea or vomiting. These patients have often suffered from typical migraine in childhood, or migraine may be frequent and severe in other members of their families.

The pain is in most cases entirely limited to one side; in a few the bouts of attacks may be on either side, though each bout is limited to one side. Very occasionally the pain, after ceasing on one side, may attack the other. The duration and frequency of the attacks varies much. Some patients suffer daily for a month or six weeks every year, while in others the attacks at first may be at intervals of weeks and gradually become more common until they occur three or four times a week, lasting most of the day and entirely crippling the patient's activities. The duration of the individual attacks also varies widely, lasting 24–48 hours in some, and as short a time as 10 minutes in others. Many of my patients have had from twelve to twenty attacks in the 24 hours. This type of neuralgia is especially liable to be mistaken for paroxysmal trigeminal tic, but differs from it in displaying no "trigger zones" (areas sensitive to light touch); nor is the attack of pain brought on by movements of the face in eating and talking, or by handling the face. Moreover, the attacks of migrainous neuralgia commence much earlier in life, commonly in the twenties. Some patients may notice, as in migraine, an unusual feeling of "fitness" or voracious hunger for some hours before an attack.

A characteristic attack will begin, often suddenly, as a violent pain in the temple, in the eyeball, or behind the eye, and will spread around the eye above and below and into the upper cheek and side of the nose. The eye often becomes very bloodshot and lacrimates, and may feel as if it is "being pulled out and hammered." The agony is often extreme and I have known patients dash their heads against a wall in desperation. It is not a lancinating, red-hot neuralgia lasting only a few seconds and recurring every few minutes, as in trigeminal tic, but a pain which persists, often for many hours, though it may occasionally be over in ten minutes. A strong wind or severe worry may start an attack. Many of my patients had previously been through the hands of oculists, dentists, and ear, nose and throat surgeons, had been furnished with glasses, and had had dental extractions and various sinus and nasal operations performed without benefit.

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PATHOLOGY AND TREATMENT

Although the pathology of migraine and migrainous neuralgia is not certainly known there is strong presumptive evidence of an intracranial vasomotor disturbance. In typical ophthalmic migraine accompanied by teichopsia or hemianopia it seems that an initial spasm or claudication of the posterior cerebral artery must be a factor. In the migrainous neuralgias which I have described the pain is more anterior, in eyeball, temple and cheek, and nausea and vomiting are rare and ocular signs nearly always absent. It seems probable that anterior vessels are involved in the claudication—possibly branches of the internal carotid and the middle meningeal artery—because the pain appears to be reflected along the recurrent meningeal nerves of the three trigeminal branches. It is probably owing to the anæsthetic effect produced on these meningeal branches by gasserian injection that permanent cure may be obtained. There is commonly excessive tenderness in the temple during the attack, and some cases have been temporarily cured for a year or more by an alcoholic piqure down to the bone in the tender area. Others have obtained complete and immediate relief, lasting for many months, by alcohol injection of the supraorbital or infraorbital nerve. Such temporary relief may be due to a reflex effect of the injection on the trigeminal system.

Since 1931 I have treated 29 of these cases by injection of the gasserian ganglion with encouraging results, 19 being completely cured, and 5 much improved. In the remaining 5 the results at first seemed to be good, but ultimately the attacks returned, though less violently. These results may be compared with the treatment of trigeminal tic by either sensory root resection or ganglion injection. The proportion of cures—about two-thirds of the total—is not as high as in trigeminal tic; but the alternative is continual doping with luminal or other sedative and analgesic drugs.

ILLUSTRATIVE CASES

CASE 1.—A married woman, aged 46, seen in April, 1911. Had suffered from spasms of neuralgia in head since the age of 16, always in summer. Pain began gradually outside right eyebrow and spread across eye, which became blood-red; pain stabbing for ¾ hour. Might have several attacks in a night. Alcohol piqure given into the temple, down to bone. Complete relief for eight months.

CASE 2.—A man, aged 33, seen in May, 1914. Since boyhood had been subject to recurrent headaches; was suddenly attacked while out shooting in October, 1912, with blinding pain in the right eyeball and at back of eye, lasting half an hour, the eye being bloodshot, with small pupil. He said the pain felt as though someone had pulled the eye out and was hammering it. This recurred twice daily for a month and then disappeared for twelve months; pain then returned suddenly, worse than before, twice daily; he was "beside himself with agony." The attack again lasted for a month. After this the pain did not disappear altogether, but occurred once or twice a week for eight months, when they again recurred severely twice daily. It was during this period that I saw him (May, 1914) and injected the infraorbital nerve with alcohol. This caused typical infraorbital anæsthesia, with immediate cessation of the pain and there was no further recurrence for 15 months.

These cases illustrate the method I used first of local alcohol piqure with infraorbital or supraorbital nerve injection. In 1920 I began to use gasserian injection in the hope of producing permanent relief.

CASE 3.—A man, aged 50, seen in November, 1934. In 1928 he began to have violent sudden neuralgia, left eyebrow and cheek to back of head lasting 1–2 hours; eye felt as if being forced out. Pain usually began at 1 A.M. In 1931 partial gasserectomy, done in Cape Town; had much pain for four months, then none for eighteen months. Since then pain had become more frequent and severe, always left-sided. Attacks nightly, beginning at 2–3 A.M. and sometimes three or four in day as well, very severe at back of eye to back of head and upper cheek, stinging in nose with stabbing pains like lightning-flashes on top of a chronic ache, lasting for several hours. Described his pains as "hellish torment." In March, 1938, I injected the left gasserian ganglion by the lateral route. Result: total anæsthesia, still unaltered 4 months later, and "not a flicker of pain" since. Keratitis began but subsided with boracic eye-bath and liquid paraffin instillations.

CASE 4.—An unmarried woman, aged 25. Six years neuralgic headaches right temple to back of eye, lasting all day once a week. Occasional nausea. Pain now spread along upper jaw. Extraction of unerupted wisdom tooth gave no benefit. In October, 1938, pain daily for several hours. Sinuses normal. Femergin and Bellergal both failed to relieve. I injected ganglion in November, 1938, during painful attack. Pain cleared at once. Total anæsthesia of upper two divisions of fifth nerve, slight anæsthesia third division; next day slight recovery of second division. Twelve months later she wrote: "Injection complete success; only an occasional slight stab, no inconvenience." She thinks stabs indicate what would have been bad attacks without the numbing of the nerve.

CASE 5.—An unmarried woman, aged 32. Seen in November, 1939. Ten years' history of left fronto-parietal headaches. Tonsils and many teeth extracted without benefit. Sinuses normal. Attacks at first once a week, now every 3½ hours. Took 8 or 9 aspirin tablets daily. Pain began over left eyebrow, and became more and more severe; eye gets congested and lacrimates. Injected ganglion in December, 1939, giving total trigeminal anæsthesia. Complete relief. Still quite well in June, 1940.

SUMMARY

A violent type of migraine, which I call migrainous neuralgia, is distinguished from migraine by the absence of premonitory symptoms and the rarity of subsequent nausea or vomiting, and from trigeminal neuralgia by the absence of trigger zones and the longer duration of attacks. Five cases are described which illustrate the characteristic symptoms and treatments I have employed since 1911—first, local alcohol piqure and infraorbital or supraorbital alcohol injection, giving relief for several months, and later alcohol injection of the gasserian ganglion, giving more lasting and probably permanent cure. Out of 29 cases 19 were completely relieved and 5 others much improved.

MANAGEMENT OF CEREBROSPINAL FEVER TREATED WITH SULPHAPYRIDINE

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ACTING SQUADRON LEADER, R.A.F.V.R.; AND
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SQUADRON LEADER, R.A.F.V.R.

THE first case of cerebrospinal fever admitted to a R.A.F. hospital at the beginning of this year's epidemic developed agranulocytosis during treatment with sulphapyridine, and died a fortnight after all signs and symptoms of meningitis had disappeared. A series of 45 consecutive cases was therefore used to find the best method of treatment. They were all treated with sulphapyridine, without any serum or antitoxin, and observations were made of changes in the clinical state and in the bacteriological, cytological, and chemical characteristics of the cerebrospinal fluid and blood, including the sulphapyridine content in two contrasting groups. There were no further deaths and every patient returned to full duty both on the ground and in the air. Clinical details of this series have been described elsewhere (Brinton 1940).

The subjects were all males, their ages ranging from fifteen to thirty, and averaging twenty years, and they had been admitted to hospital from seventeen different centres. Prior to the illness they had all been in excellent health. Treatment was begun within 24 hours of the onset of symptoms in 4 cases, on the second day in 17, the third day in 9, the fourth day in 6, and later

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than that in 5 cases. In 4 a definite history of the onset was not available. In 8 patients symptoms of septicæmia had been present for from two to fourteen days before the onset of meningitis; 6 of these had involvement of joints and 3 had tender subcutaneous nodules. The severity of the illness varied greatly and in assessing the result of treatment this factor was considered in contrasting groups of patients.

On admission 10 patients were deeply comatose and 11 showed definite clouding of consciousness; the remaining 25, though not necessarily completely alert, could give a history and coöperate in treatment. All complained of headache on regaining consciousness and in half of the patients it was distressing; all had neck rigidity and in all except 4 Kernig's sign was positive; 34 had vomited repeatedly before treatment was begun. A characteristic petechial eruption was present in 29 and large ecchymoses and conjunctival and mucosal hæmorrhages was also seen.

Local nervous signs were unusual. One patient had a transient unilateral extensor plantar response on admission and in 6 the tendon jerks were obtained with difficulty. In another 6 there were defects of extra-ocular movement, usually very slight. These included two partial 6th and one partial 3rd nerve palsy, ptosis, diplopia, and defective convergence. There was unilateral facial weakness in 4 patients, and 3 had transitory deafness in one ear.

Meningococci were seen in direct smears or 24-hour glucose-broth cultures in 36 cases.

GENERAL MANAGEMENT

The nursing and management of the cases did not differ greatly from that described by previous writers (Banks 1940). Many patients were already dehydrated before admission and glucose drinks were given in all cases. Rectal salines were occasionally used, but parenteral methods of administration were not found necessary in any case.

In an early group of patients nausea and vomiting were associated with constipation during sulphapyridine treatment and subsequently all patients taking the drug were given an enema if they had not passed a motion for 48 hours.

Restlessness was allayed by chloral hydrate in doses up to gr. 30 by mouth, or if this was impracticable through nausea or lack of coöperation by paraldehyde ʒ iv per rectum. In some very restless patients, and in those who had a severe headache and were sleepless, morphine sulphate gr. ¼ was effective and without ill effect. Barbiturate analgesics were also used.

SULPHAPYRIDINE

Dosage.—Sulphapyridine (M. & B. 693) was used in all cases. Whenever possible the drug was given by mouth in doses similar to those recommended by Hobson (1938) and Banks (1940). It soon became clear that patients would tolerate a very large loading dose with absolute safety. Only thus can the concentration of sulphapyridine in the blood and cerebrospinal fluid be raised rapidly to an adequate level. Thereby the duration of meningeal symptoms and the course of chemotherapy may be shortened, and the likelihood of toxic symptoms ranging from simple nausea and morbilliform rashes to severe agranulocytosis reduced.

The dosage ultimately considered the most favourable was as follows:—

Day	Dosage	Daily total
1st	2 g. on admission	—
	2 g. 2-hourly for 2 doses	—
	1 g. 4-hourly	Maximum of 10 g.
2nd	1 g. 4-hourly	6 g.
3rd	1 g. 6-hourly	4 g.
Thereafter	1 g. 8-hourly	3 g.

The daily dosage was maintained at 3 g. until a total of 30 g. had been given, when a differential white-count was done. All signs of meningeal irritation had usually disappeared at this stage—that is, about a week from the onset of treatment—but if they had not, and if the number and type of polymorphonuclear leucocytes were satisfactory, treatment was continued until the last trace of neck rigidity had disappeared. In this series the white-count never fell below 8000 per c.mm. The total dosage ranged from 32 to 48 g., being usually 34–38 g.

Probably a smaller loading dose and shorter period of administration and a smaller total dose would prove sufficient in most cases. Hobson (1938) has shown that smaller concentrations of sulphapyridine than were reached in this series are bacteriostatic, but since no serious complication of chemotherapy arose we think it was reasonable in so serious a disease to use the larger dosage, in order to be certain of achieving an adequate concentration in the cerebrospinal fluid in all cases. Similarly the clinical and laboratory signs of infection disappear so rapidly with the large loading dose used that continuation of treatment after the first few days is more judicious than essential.

Mode of administration.—Tablets of sulphapyridine were usually crushed in water and taken by mouth. When there was nausea 1% mucilage of tragacanth as a vehicle was extremely effective in preventing vomiting. With persistent vomiting or deep coma a solution of sodium sulphapyridine was given deeply into the gluteal muscles. This was discontinued because its extreme alkalinity caused permanent changes in 2 patients, who complained of stiffness and weakness in the corresponding legs. Examination in hospital later revealed slight wasting of the calf with an absent ankle-jerk and partial upper sacral anæsthesia. Four months after these men had returned to duty there was no sensory loss, but the ankle-jerk was still absent and the calf a little thin. The stiffness and weakness improved greatly under physiotherapy. In 1 case the injections were incorrectly given, the chemical invaded the subcutaneous tissue and two large indolent sloughs developed. When vomiting occurred later in the series, sulphapyridine was temporarily replaced by the same dose of sulphanilamide. This was successful, for when sulphapyridine was begun again there was never any recurrence of vomiting.

LUMBAR PUNCTURE

In all cases lumbar puncture was performed on admission to establish the diagnosis. In the first 15 cases it was repeated at least once daily until the pressure had fallen to normal or the cerebrospinal fluid had become clear. From three to seven punctures were made, four being usual, and each time sufficient fluid was removed

TABLE I—CONDITION ON ADMISSION OF PATIENTS WHO HAD (1) A SINGLE DIAGNOSTIC LUMBAR PUNCTURE AND (2) A DAILY PUNCTURE

	Lumbar puncture	
	Daily	Single
Number of cases	20	25
Days ill before admission	2·4	2·4
Consciousness:—		
1. Deeply comatose	20%	23%
2. Clouded	30%	13%
3. Relatively clear	50%	62%
Headache	No apparent difference	
Vomiting		
Meningeal signs		
Cranial nerve palsies	35%	15%
Rash	70%	62%
Toxic signs	55%	46%
Meningococci recovered	94%	77%
Septicæmia	20%	16%

to reduce the pressure to 100 mm. of water. Undoubtedly the headache was sometimes eased and one patient rapidly became more alert after drainage of cerebrospinal fluid, but the general response to sulphapyridine was so rapid that repeated lumbar puncture seemed unnecessary. Consequently a group of clinically similar patients was treated with sulphonamides alone, when one diagnostic puncture had been made, and later another group was punctured daily. The condition of the two groups on admission is contrasted in table I. This shows that the two groups, although small, were strikingly similar, that receiving daily lumbar puncture having slightly more generalised toxic and septicæmic signs. As far as possible the two groups were unselected samples of the epidemic.

RESPONSE TO TREATMENT

Clinical response.—Table II shows the average duration in days of early meningeal symptoms and signs under the two types of treatment. As might be expected there was no appreciable difference in the relative duration of general systemic concomitants of the disease, such as signs of toxicity, involvement of joints and herpes febrilis. There was one example of herpes zoster in each group.

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All the patients were fully re-examined within twenty-four hours of their discharge from hospital. There were no visible cranial-nerve palsies in any patient. In the first group 2 patients and in the second group 1 patient had relative bilateral deafness to high tones, and in the second group 1 patient had slight unilateral deafness.

TABLE II—DURATION OF EARLY MENINGEAL SYMPTOMS AND SIGNS (DAYS)

	Lumbar puncture	
	Daily	Single
Unconsciousness	2·7	2·0
Headache	5·4	3·1
Neck rigidity	4·8	4·1
Vomiting	Unrelated to procedure	

After a month's sick leave all the patients returned to duty. Those engaged in flying returned to flying duties. At present 42 patients have been re-examined more than three months after returning to duty. There have been no sequelæ of cerebrospinal meningitis in any of these patients. Slight stiffness of a leg in 2 patients has already been referred to, and there was one mild anxiety state.

Cerebrospinal fluid.—Specimens of cerebrospinal fluid and blood were taken from patients in each group two hours after the last dose of sulphapyridine. With the patient recumbent and relaxed the average final pressure in the group having repeated punctures was 180 (range 70–270) mm. of water and in those who had been treated without drainage of cerebrospinal fluid 150 (range 110–250) mm. of water. In both groups there was a lymphocytic pleocytosis with an average of about 50 cells (range 10–1900) per c.mm. The fluid was invariably sterile on culture.

In the group which received repeated drainage the clinical signs of meningeal irritation were found to be a more delicate index of the control of the disease than were cell-count or sugar content of the cerebrospinal fluid, and the clinical state was unrelated to abnormal levels of intracranial pressure.

Sulphapyridine content.—In the group of cases receiving repeated drainage the cerebrospinal-fluid pressure was maintained at a relatively low level. If sulphapyridine is filtered passively into the fluid from the blood this procedure might have facilitated its passage. On the other hand, if the drug passes as part of the active secretion of the cerebrospinal fluid (Flexner 1934) the difference in pressures in the two groups should not affect its relative concentration in the fluid. Again, removal of large volumes of cerebrospinal fluid heavily loaded with sulphapyridine might result in a considerable lowering of the sulphapyridine content through replacement by dilute cerebrospinal fluid. In order to find whether repeated drainage materially affected the sulphonamide concentration in the cerebrospinal fluid estimations of the sulphapyridine content were made in the simultaneous specimens of fluid and blood, using Marshall and Litchfield's (1939) colorimetric method. The detailed results are shown in table III.

TABLE III—SULPHAPYRIDINE CONTENT OF CEREBROSPINAL FLUID (C.S.F.) AND BLOOD

Cases with repeated drainage			Cases without drainage		
Total content (mg. per 100 c.cm.)		Ratio C.S.F./ blood content	Total content (mg. per 100 c.cm.)		Ratio C.S.F./ blood content
Blood	C.S.F.		Blood	C.S.F.	
9·6	4·6	47·1	6·6	3·3	49·3
10·3	2·5	24·7	18·0	3·9	21·7
3·8	1·8	42·2	3·3	2·1	62·1
5·9	1·7	29·2	5·5	3·2	59·7
5·0	2·2	43·5	3·2	1·5	48·2
3·3	1·5	47·6	4·2	2·1	50·5
2·3	1·4	63·0	13·6	7·1	52·9
2·5	1·4	58·0	8·4	4·8	56·2
2·0	1·1	53·5	4·2	3·6	85·2
4·4	2·1	47·5	5·8	4·0	67·4
5·0	2·4	48·3	7·9	5·3	67·6
2·2	0·8	37·8	6·6	2·8	42·9
2·1	0·7	36·6	4·6	3·2	69·1
			6·3	4·3	67·1
			5·8	4·4	75·3
			5·6	3·7	65·3
			6·1	5·0	81·3
			5·4	4·2	77·6

The absolute value of the cerebrospinal fluid content of sulphapyridine depends directly on the blood content, which is in turn related to the vagaries of absorption of the drug from the alimentary canal (Allott 1938). This figure is therefore of no value in individual cases in comparing the efficacy of the two methods of treatment. In a series of cases it has greater significance. On the other hand the ratio of cerebrospinal fluid and blood contents is a true index of the efficiency with which the drug is transferred through the choroid plexus. This ratio in the two groups, expressed as C.S.F. content in mg. per 100 c.cm./blood content in mg. per 100 c.cm., is therefore included in the tables.

TABLE IV—AVERAGE OF FINDINGS IN TABLE III

	Lumbar puncture	
	Repeated	Single
Number of estimations	13	18
Average C.S.F. content of sulphapyridine (mg. per 100 c.cm.)	1·9	4·0
Average ratio C.S.F./blood content	42·2	59·2

The results in table III show the wide variations in absorption of sulphapyridine into the blood, previously commented on by Allott (1938). Such wide variations as 2·9 and 18·05 mg. per 100 c.cm. in the blood occurred under standard conditions of administration, collection, and determination. It is evident from the detailed results and from the average determinations in table IV that irrespective of the blood level the absorption of sulphapyridine into the cerebrospinal fluid was more efficient in those cases where the normal mechanism of cerebrospinal fluid formation and removal was not interrupted.

DISCUSSION

The end-results in this series should not be contrasted with those obtained in the same epidemic in the civilian population. Many factors contributed to the return of every patient to duty. The duration of the disease before beginning treatment was relatively short. The lowest mortality in all epidemics always occurs in the age-group represented by this series. Lastly, all the men were in excellent physical health before the infection. But even if allowance is made for these factors the results are good and the therapeutic procedure is proved to be adequate.

The absence of sequels in patients treated without drainage is significant, for failure to remove the infected purulent cerebrospinal fluid did not cause any disability, although basal adhesions causing internal hydrocephalus and cranial nerve palsies were in the past related to accumulation of pus in the basal cisterns. An added justification for the abandonment of routine therapeutic lumbar puncture is that the cerebrospinal fluid was clear in all cases at the end of treatment, and the cell-count was no higher in those cases which had not been drained, while the pressure was actually lower. It is plain that with bacteriostasis the cerebrospinal fluid can return almost to normal in a few days. In one case the cell-count actually fell from over 20,000 polymorphs per cu. mm. to less than 20 cells (lymphocytes) in an otherwise normal fluid in seven days, without any drainage.

Great importance has been attached to a reduction in intracranial pressure, but recent experimental work (Williams 1939) has shown that high intracranial pressure alone does not necessarily cause cerebral damage. In all but 3 of the group treated without puncture the pressure had fallen to within normal limits at the end of treatment, compared with an abnormally high intracranial pressure in 6 of the other group. The patients whose intracranial pressure remained high were clinically normal and had no complaints. It is generally accepted that lumbar puncture may cause temporary relief of headache and may occasionally produce remission of the meningeal symptoms or diminution in the depth of unconsciousness, and when it can be performed without distress to the patient it may sometimes be justified for symptomatic relief alone. But with chemotherapy the period of grave illness is so short and the difficulty in

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performing lumbar puncture in the first few days is often so great that we doubt whether drainage of the cerebrospinal fluid will remain a routine treatment. No rule can of course be made to cover exceptional cases.

Neither the high cerebrospinal-fluid pressure nor the absence of artificial drainage prevented the passage of sulphapyridine through the choroid endothelium into the cerebrospinal fluid, as the relevant C.S.F./blood ratios indicate. It seems that the concentration of sulphapyridine in the cerebrospinal fluid maintains a higher level if the normal flow and absorption of fluid is undisturbed by repeated drainage. The concentration of sulphapyridine under these conditions is more than is required for adequate bacteriostasis (Hobson 1938), whereas it was distinctly low in the patients whose cerebrospinal fluid was repeatedly removed.

There is only one satisfactory explanation for the lower concentration of sulphapyridine in the cerebrospinal fluid collected after repeated drainage. It is probable that fresh fluid is rapidly secreted through the inflamed hyperæmic choroid plexus. The relatively large molecule of sulphapyridine cannot pass from the blood through the endothelial lining with sufficient ease to maintain a high concentration in fluid that is being rapidly replaced. That such difficulty exists is shown by the observation that whereas the ratio of sulphanilamide in the cerebrospinal fluid to that in the blood approaches unity the corresponding ratio for sulphapyridine is only 48% under normal conditions and 56% in the presence of meningitis (Hobson 1938). Thus repeated drainage results in dilution of the loaded cerebrospinal fluid with newly secreted fluid of low content, the fluid lagging behind the blood in its absorption of sulphapyridine, so that further fluid is removed before the maximal concentration can be re-established.

These observations suggest that full doses of sulphapyridine over a few days ensure a sufficient absorption of the drug for the disease to be controlled, for the cerebrospinal fluid to return to normal, and for the patient to regain perfect health in minimal time without any lumbar puncture.

SUMMARY

Forty-five consecutive cases of epidemic cerebrospinal fever in young adults have been used to investigate the best method of administering sulphapyridine. All the patients have returned to duty in the R.A.F., and have remained free from any sequels. The concentration of sulphapyridine in the cerebrospinal fluid was higher in a group treated without thecal drainage than in those in which repeated lumbar puncture was performed. The significance of this is discussed in relation to the absorption of sulphapyridine. It is concluded that when adequate doses of sulphapyridine are given the disease can be effectively controlled without therapeutic lumbar puncture.

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SULPHATHIAZOLE IN MALARIA

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In our previous communications (THE LANCET, 1938, **2**, 79; and 1939 **1**, 1382) we published charts showing the antimalarial activity of Prontosil Red tablets, Proseptasine, and sulphapyridine. Since each of these three compounds contains the group $:N.C_6H_4.SO_2.NH.$, we expected to find that sulphathiazole would have a similar action.

Fig. 1 illustrates the effect of sulphathiazole on the rigors and parasites in a general paralytic inoculated with benign tertian malaria on June 3, 1940. Fig. 2 shows the fluctuations of benign tertian parasites in another general paralytic from whom all antimalarial treatment was withheld until after the eleventh rigor. This chart was chosen from our records as a control illustration because it closely resembles the first up to the point at which sulphathiazole was given.

The maximal daily dosage of sulphathiazole was 2 g. thrice daily at intervals of four hours. The patient vomited three hours after the second dose of 2 g., on July 28, but the subsequent doses caused no further complications.

Since the patient whose chart is shown in fig. 1 had a rigor on three consecutive days before the first dose of sulphathiazole, it seems highly improbable that the subsequent spacing of the remaining three rigors was spontaneous. Moreover, the parasite count fell from 90 to 4 per hundred fields and remained at a fairly low level for nine days before the quinine was given. There was no history of previous malaria or of residence abroad, and three other patients subsequently inoculated with the same strain have reacted normally. Hence there was no evidence of any tendency for the malaria to abort without treatment, such as might have happened with a partially immune host or with a "tired" strain.

On the other hand, our previous reports showed that the parasites could be temporarily eliminated from the blood-stream by even smaller doses of the other sulphonamides already mentioned. The relatively rapid excretion of sulphathiazole (see THE LANCET, 1940, **1**, 883), however, may be responsible for its failure in this respect.

Our thanks are due to Dr. J. D. Silverston for permission to publish this case, to Dr. M. B. Milne for her coöperation, and to Messrs. May and Baker Ltd. for supplying the sulphathiazole (M. & B. 760).

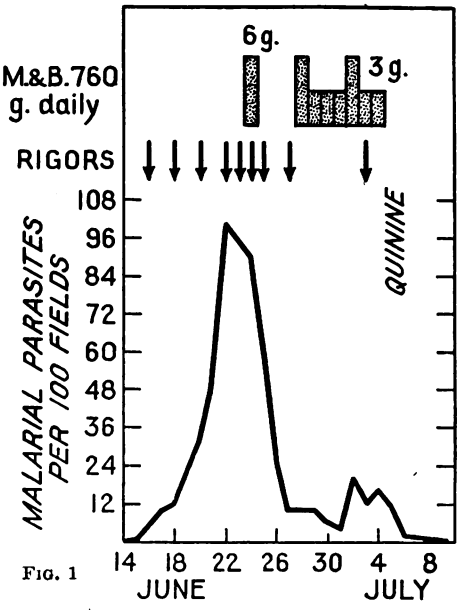

FIG. 1

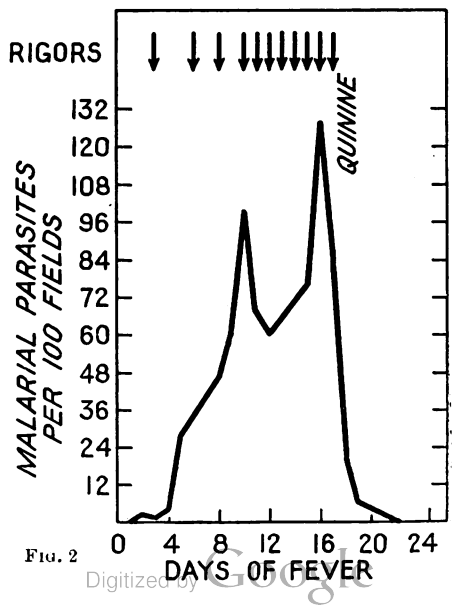

FIG. 2

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ANDROGEN AND PREGNANDIOL EXCRETION IN HYPERTRICHOSIS

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A WOMAN of 26, after a normal childhood and pubescence, had begun at the age of 19 to show an excessive growth of hair. The growth had increased, especially in the last two years, until it had become stationary a few months previously. Menstruation had begun at 13 and had continued regularly with a loss for five or six days every twenty-seven or twenty-eight days. There was occasional slight dysmenorrhœa. She had never been ill, her appetite was good, bowel action and micturition normal and weight constant. Her father, mother and one sister were alive and well and there was no family history of endocrine disorder.

She was of medium height, with a slim figure and feminine contours (fig. 1). Her skin was sallow, as it had always been. The breasts were small but normal, except for deeply pigmented nipples and areolæ. The whole body was more than normally hirsute. The eyebrows were thick and the sides of the face, upper lip and chin were covered with thick, black, coarse hair (fig. 2). The axillary hair was excessive and the pubic hair luxuriant and of male distribution, a fact not well shown in the photograph. The legs and forearms were as hairy as those of an average adult man. There were no striæ atrophicæ. The skin between the hairs was soft and normal. She was a virgin. By rectal examination the pelvic organs were found to be normal. No other abnormalities were found on examination. The blood-pressure was 122/70 and the pulse-rate 72. Psychologically she was heterosexual. Though naturally unhappy about her appearance, she had made a commendable adjustment and did not allow it to occupy her thoughts unduly. She had a "boy friend" whom she hoped to marry one day.

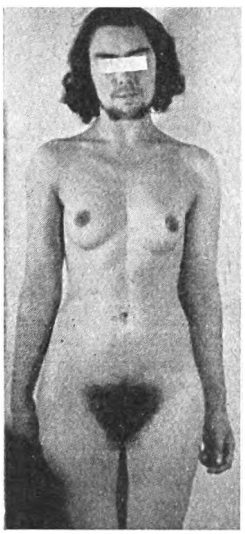

FIG 1

The urine contained no sugar or acetone. The glucose-tolerance test (Dr. N. F. Maclagan) showed a fasting blood-sugar of 100 mg. per 100 c.cm. After 50 g. of glucose the figures in successive half-hours were 170, 180 (at which point a trace of sugar was present in the urine), 140, 100. The blood-count was as follows: hæmoglobin, 102%; red cells, 4,900,000; colour index 1·0; white cells 5200 (polymorphs 4316 (83%), basophils 52 (1%), lymphocytes 572 (11%) and monocytes 260 (5%)). Pyelography and adrenalography (Mr. F. A. d'Abreu) showed no abnormality. The adrenals were not very clearly shown. The urea-concentration test was normal.

Estimations of the excretion of androgens and of pregnandiol were performed by Dr. R. K. Callow at the National Institute for Medical Research. A preliminary examination for androgens in a 24-hour specimen of urine was done. Later, the total urine over a period of a month was collected; toluene was used as a preservative and extraction was carried out with as little delay as possible. Half the urine was used for 17-ketosteroid assay by the method of combined hydrolysis and extraction and colorimetric assay, and the other half for sodium pregnandiol glucuronidate assay by the method of Venning (1938). The results are shown in the table.

DISCUSSION

Androgen excretion.—The normal range of excretion of 17-ketosteroids is 2·5–12·5 mg. a day. The patient's values varied about a mean of 19 mg., being always above the usual limits for a normal woman and sometimes exceeding double this figure. The rise in the middle of the cycle is not statistically significant. It is reasonable, therefore, to assume some degree of hyperplasia of the adrenal cortex apart from clinical evidence. On the other hand, no patient with an adrenal tumour confirmed by operation or post-mortem examination has given a figure below 40 mg. per diem. It was therefore decided, taking her psychological normality into consideration, that laparotomy should not be urged.

Pregnandiol excretion.—The pregnandiol recorded as "trace?" was separated in amounts too small to be definitely identified. Venning and Browne (1937) and Venning, Henry and Browne (1937) have shown that sodium pregnandiol glucuronidate is absent from the urine of normal women during the follicular phase of the menstrual cycle but is present during part or the whole of the luteal phase. Since it was not present in the urine of my patient at any time of the cycle it may be presumed that, in spite of the apparent regularity of menstruation, ovulation did not occur during this particular cycle. Unfortunately the war has made it impossible to confirm this deduction for other cycles by endometrial biopsy.

FIG. 2

That a relationship exists between the adrenal glands and progesterone metabolism is shown by a number of observations. Gaunt and Hays (1938) and Fisher and Engel (1938) have reported that it is possible to prolong the life of adrenalectomised ferrets and rats by means of progesterone, the animals dying when the injections were discontinued. A substance having progestational effects was obtained from the adrenals by Engelhart (1930) and Callow and Parkes (1936). A substance biologically and chemically identical with progesterone was isolated from ox adrenals by Beall and Reichstein (1938) and Beall (1938). Finally Venning, Weil and Browne (1938) have reported two cases of "virilism" in which the excretion of sodium pregnandiol glucuronidate was increased. One excreted 12 mg. a day for seven days before the removal of a carcinoma of the adrenal cortex, but none after the operation. No corpus luteum was found at autopsy. The other, whose left adrenal gland was hypertrophied and whose ovaries were small and apparently without corpora lutea, excreted 20–30 mg. a day for two weeks. The second case, of which details are not given, differed from mine in that she had never

Date	Period (days)	Volume	pH	17-Ketoster. (mg. per 24 hr.)	Pregnandiol
Previous test					
Dec. 10–11, 1939 ..	1	1·7	5·5	22	No assay
Complete month					
Mar. 13–16, 1940 ..	3	1·7	6·0	16	Trace ?
16–19 ..	3	2·2	5·5–6·5	18	0
19–21 ..	2	2·6	6·0	26	0
21–23 ..	2	2·3	5·5–7·5	22	0
23–25 ..	2	2·3	6·0	16	0
25–28 ..	3	5·2	6·5	21	0
28–31 ..	3	3·2	6·0	17	Trace ?
Mar. 31–Apr. 2, 1940 ..	2	2·4	5·0–6·5	21	0
2–5	3	3·5	5·5–7·0	16	0
5–8	3	3·8	5·0–6·0	20	0
8–10.. ..	2	2·5	5·5–7·5	18	0

"Menstruation" occurred March 8–12 and April 4–9.

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menstruated. The results in my case suggest that progesterone was being produced neither from the ovaries, owing to the absence of ovulation, nor from the adrenals, in spite of hypertrophy.

SUMMARY

A case of adrenal hypertrophy is described in which the clinical diagnosis is confirmed by the assay of male hormone excretion. The patient excreted no sodium pregnandiol glucuronidate, from which fact one may assume that no progesterone was excreted by her adrenal glands.

I wish to thank Mr. Aubrey Goodwin for referring the patient to me, Dr. R. J. V. Pulvertaft for the photographs and Dr. Callow for the assays and much helpful advice.

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INFLUENZA VIRUS AND THE INCIDENCE OF PRIMARY LUNG TUMOURS IN MICE

BY J. ARGYLL CAMPBELL, M.D., D.Sc. Edin.
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INFLUENZA has been mentioned as a possible cause of lung cancer in man (see Campbell 1937b). In a statistical examination of the Yale autopsy protocols 1917–37 Rosahn (1940) found that there has been a real and absolute increase in lung carcinoma and recalls that in 1920, after an extensive experience with the pathological aspects of influenza, Winternitz and his colleagues prophesied such an increase because of the metaplasia of the bronchial epithelium and proliferation of young cells produced in the lungs. A possible criticism here is that the changes would have to persist for the production of cancer, and there is evidence from ferrets infected with human virus that the proliferation of the bronchial cells and the other changes become less marked and disappear as the animals recover (Perrin and Oliphant 1940).

Three years ago some experiments were begun to determine the combined effects of influenza virus and exposure to an atmosphere containing dust from tarred roads on the incidence of lung tumours in mice. It had already been demonstrated (Campbell 1934, 1937a) that such dust—both with and without the tar—increases the incidence of these tumours, and it was thought that the infection with the influenza virus might hasten or extend the carcinogenic action of the dust.

My colleague Dr. C. H. Andrewes vaccinated some mice, aged about two months, by peritoneal injection of virus vaccine, which produced no symptoms; this was followed by intranasal instillation of live virus. The survivors, about three months old, were then exposed for about ten minutes once an hour to a cloud of dust; in all six times a day on five days every week over a total period of a year. This technique has been described elsewhere (Campbell 1934, 1940). The sample of tar dust did not contain a very active carcinogenic agent since it did not produce cancer of the skin in the dusted mice. Some other samples of such dust have produced cancer of the skin when merely dusted on the mice (Campbell 1934). However, since an increase in incidence of lung tumours although less definite has been obtained with road dust from which the tar has been completely extracted by benzene (Campbell 1937a) the sample used in the present experiment should have produced a similar increase. It is possible that road dust may contain carcinogenic agents which are not soluble in benzene.

In all, 23 of the mice infected with influenza were dusted but only 13 of these lived to the age of ten months or longer. Only 2 of the 23 mice possessed tumours of the lung and in both cases the tumours were malignant. The ages of the 2 mice were 605 and 877 days, so that both had been exposed to the dust for the full period of a year. Since tumours of the lung are very rare in mice younger than ten months attention has been directed mainly to those older than this. In the present case only 2 or 15·4% of the mice older than ten months developed lung tumours. This is not a high incidence since the average figure for 593 control (not specially dusted) mice of similar age is 11·3%, and for 727 dusted mice 31·5%. From these figures it appears that the influenza virus has an inhibitory effect on the development of primary lung tumours in mice. At the same time it is realised that the number of influenza mice is rather few.

It has been noted before (Campbell 1940) that mice exposed to a dusty atmosphere and living ten months or longer reveal at death an increase in the incidence of hyperplasia of the lymph tissue both in the lungs and in the tracheobronchial nodes. In the present case the figures were 32 and 54% respectively, compared with about 8 and 12% for large numbers of control mice. The incidence of bronchopneumonia in the present case was 15%, compared with 10% for controls. As regards the hyperplasia of the cells of the bronchial mucous membrane as seen in influenza, only one mouse showed such a condition and this mouse was the first to die and had been dusted on two days only before death, at a time when the effects of the influenza virus could scarcely have disappeared.

SUMMARY

Influenza virus had, if anything, an inhibitory effect on the development of primary lung tumours in mice.

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A BULLET IN THE HEART FOR TWENTY-THREE YEARS

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A GENERAL interest in the fate of foreign bodies encourages me to report the case of a man who is alive and well and has gone about his daily work for the last 23 years with a bullet lodged in the wall of the left ventricle.

The patient, aged 32, was admitted to a base hospital under my care in April, 1917. Eighteen days before admission he was struck on the front of the left side of the chest by a bullet from a machine gun at an estimated range of 500 yards. There was also a through-and-through wound of the left arm just above the elbow; this may have been inflicted by the same bullet which penetrated the chest. In its course the missile traversed a service waterproof, the left breast pocket of his tunic with its contents and his shirt (fig. 1).

When I first saw the patient, his only complaint was of some slight soreness about the wound on the chest. He was a well-developed man with rather a big chest and looked fit and well. There was a small wound of entrance ½ in. below and ¼ in. external to the left nipple, but there was no wound of exit. There were the scars of the through-and-through wound about 2 in. above the left elbow, but this had apparently done no damage, and no disability ever arose from it. The situation of the wound on the chest wall at once suggested the possibility of some cardiac injury, but there were no characteristic signs. The pulse was regular and its average rate 64, and the temperature was normal. There was no dyspnœa.

Radiography showed that a service bullet, with its base anchored probably near the tip of the left ventricle,

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was pulsing with the heart beat, while its point was whirled about in the blood vortex in the heart cavity. An electrocardiogram was submitted to the late Sir James Mackenzie, who reported :—

"The electrocardiogram shows nothing peculiar, excepting in the second lead where the wave T is inverted. This inversion of T was assumed at one time to be of serious significance, but I have watched cases who show it for a great many years, and this view has turned out to be unjustified."

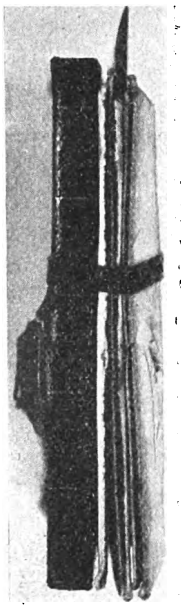

FIG. 1—Notebook and letters traversed by bullet before entering heart.

The patient was apparently quite well and was finding enforced rest irksome. On May 12 he was allowed to get up and to walk about the ward and up and down stairs.

OPERATION

It seemed that the patient ran a great risk with a foreign body in so precarious a position, and I feared that at some time it would become dislodged and cause fatal embolism, or that blood would clot about it and produce a thrombus which might also cause embolism. Consequently I decided to attempt to remove the bullet.

The operation was performed on May 20, thirty-nine days after the receipt of the wound. The anæsthetic used was A.C.E. followed by open ether. The approach was made by the left parasternal route, and the general technique was as described by Theodore Kocher, in the third English edition of his textbook of operative surgery.

The skin incisions were along the line of the left sixth costal cartilage and vertically over the sternum to the level of the second. As a first step the 6th costal cartilage was excised and the pericardium easily exposed by dividing the attachment of the triangularis sterni muscle along the seventh costal cartilage and the sternum and pushing it outwards and upwards. Immediately air began to be sucked into the cellular tissue around the pericardium to such an extent that this area rapidly became emphysematous. It closely simulated air in the pleura and was rather an anxiety throughout the operation, though it was controlled to some extent by covering up the exposed part with large wet gauze swabs. The fifth and fourth costal cartilages were next cleared, the pleura being separated from their deep surfaces and gently pushed outwards by the finger before they were divided.

The flap of chest wall was then bent outwards; but, since this did not give enough working space, the third cartilage also was cut through and displaced. The pericardium, which was not distended, was readily opened by an oblique incision about 2 in. long made in the direction of the sixth cartilage. A little bloodstained fluid escaped, but there were no clots and no adhesions. When the heart was first exposed it beat in a tremulous fashion, but soon quieted down, and throughout the subsequent manipulation its movements were steady.

The spot where the bullet had entered, about the middle of the outer border of the left ventricle slightly towards its posterior aspect, was marked by a depression surrounded by a roughened whitish area on the visceral pericardium. The heart muscle round the wound felt firm but it was impossible to locate the bullet by palpation, because diastole allowed only 1 sec. of relaxation, the cardiac muscle becoming stony hard during systole.

The region of the scar and the area near the ventricular base were explored by puncture with a straight needle, without finding the bullet. The heart muscle was surprisingly tough, and the punctures only bled momentarily. The left auricle was then explored by external palpation, but nothing abnormal was detected.

It was still felt that the bullet might be lodged about the suspected area near the base of the ventricle. To steady the heart for final exploration a stitch of fine catgut was passed into the wall of the ventricle just by the side of the entrance scar. To gain a little more working space the sternal stumps of the divided costal cartilages were removed. Gentle traction on the stitch steadied this portion of the heart wall without in the least affecting its general action. Further punctures were made with the needle, but no bullet was found.

Since I was reluctant to give up the attempt, I exposed the posterior surface of the heart high up behind the ventricle by rotating the heart and then taking it into my hand for thorough palpation. By this method something hard and elongated could be felt in the centre of the heart, presumably near the base of the interventricular septum. But this examination gave us a fright, because the heart stopped beating as soon as mild pressure was applied to the base.

Consequently the heart was replaced in its normal position and the pericardium was sutured, a small drainage-tube being left in the lowest part of the sac and another laid along the outside near the suture line. The flap of chest wall was replaced and held in position with catgut sutures between the periosteum of the sternum and the perichondral structures. The skin was sutured with interrupted silkworm without tension, the drains being brought through the centre of the lower oblique incision.

The operation took an hour and three-quarters, the greater part of that time being spent in efforts to locate the bullet. The patient stood the ordeal well, and immediate recovery was satisfactory. The only troublesome symptom was persistent vomiting without nausea, and this was really distressing. For days the patient could keep nothing down, but in spite of this he seemed well and was quiet and undisturbed. In the course of a week the condition gradually subsided, having been entirely uninfluenced by treatment. The patient was well enough to be out of bed in three weeks. Five weeks after the operation, when he began to walk, the wound was firmly consolidated and the chest expanding well. Radiography a month after the operation showed the bullet in precisely the same position as before and moving with the heart beat, but the whirling movement had ceased.

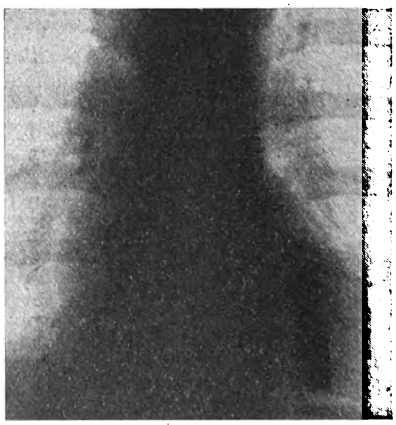

FIG. 2—Radiogram showing bullet in left ventricle twenty years after the casualty.

SUBSEQUENT HISTORY

The patient left hospital nine weeks after the operation and thereafter steadily improved. In November he reported himself as very well, and next year he was transferred to the records office of his regiment. After taking his discharge early in 1922 he had a long rest before resuming civilian occupation in an office. Thereafter he was able to do all ordinary things in moderation, including a mild game of golf. Ten years after the operation he married. At times he was perhaps rather apprehensive and a little too careful. In consequence he put on weight unduly and suffered from indigestion.

In June, 1937—i.e., just over twenty years after the wound—he came to see me. He was very well and had no cardiac disability. His employment was indoors, but he lived in the country and usually drove his car to his office seven miles from home. When the weather was fine, but not in cold weather, he walked one and a half miles to the nearest village and travelled by 'bus. During recent years he had been making a garden and worked a good deal. He had given up golf a few years ago

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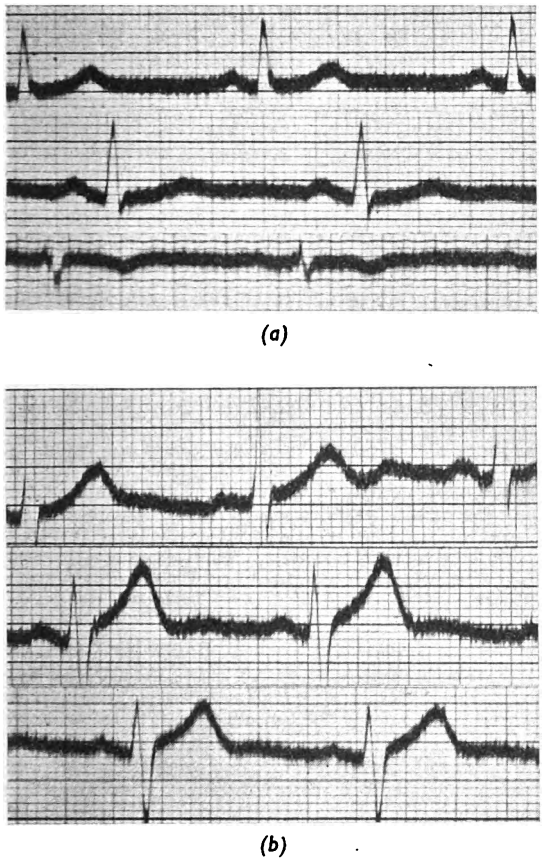

FIG. 3—Electrocardiograms taken twenty years after bullet entered heart: (*a*) limb leads; (*b*) chest leads.

because he thought it would perhaps be wiser not to exert himself unduly. Five years ago his appendix was removed under local anæsthesia. Recovery was uneventful, and he was back at the office in five weeks.

Dr. Duncan White radiographed him and reported: "A bullet is embedded in the wall of the left ventricular septum (fig. 2). Its movement is synchronous with the cardiac contractions. There is slight enlargement and rounding of the left ventricle, with very slight unfolding of the aorta."

Dr. R. S. Aitken, now Professor Aitken of Aberdeen, examined the patient's chest and found, except for some emphysema, no sign of disease. The heart appeared to be normal, the pulse was steady, and its rate was about 62. The blood-pressure was 138/88. At the same time Dr. Paul Wood made an electrocardiogram (fig. 3), which he reported as being entirely within normal limits.

In April, 1940, the patient reported that he was quite well, though he confessed to being a little tired, "a result of the present war, not the last one!" When fatigued he suffers from what he describes as indigestion, but this passes off after a week or ten days' rest.

CONCLUSION

The management of cases of foreign body in the heart which are not immediately fatal must be settled on general surgical principles. Nature should be assisted to exhibit her powers as a healer, and the patient with cardiac disability after gunshot wound should have many months of rest. If, in spite of a fair chance, the disability persists or develops after a period and interferes with usefulness, the aid of surgery may properly be invoked; but the difficulties may be very great, and even during operation a wise restraint may save a disaster. As the late Mr. Frank Jeans, of Liverpool, was fond of saying, "A living problem is better than a dead certainty."

BRONZED DIABETES IN A WOMAN

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Hæmochromatosis or bronzed diabetes is an uncommon disease in men but is extremely rare in women. It is not always easy to determine whether a case showing cirrhosis of the liver, diabetes and some skin pigmentation is really a true case of hæmochromatosis, but I have seen and treated 28 certain cases in men in 16 years, whereas this is the first woman. This sex proportion is well known and Sheldon[1] in sifting the literature records 295 males but only 16 females, a ratio of about 18 to 1.

A thin woman of 73 was referred to our diabetic clinic with diabetic symptoms and a heavy glycosuria. She had noticed a dry mouth for some 2 years, but intense thirst and polyuria and pruritus vulvæ had been present for only 1 month. The urine contained 4% sugar, traces of ketone bodies, but no other abnormality, and the blood-sugar concentration was 358 mg. per 100 c.cm., proving that she had true diabetes mellitus. She gained a little weight at first on insulin, but then slowly lost 8 lb. and was admitted to hospital for full investigation which established the following characteristics of hæmochromatosis.

Skin.—The patient is a brunette but had noticed that her colour had been getting darker for many years. The whole skin is now a dirty light brown colour, but the exposed area—the hands and especially the face—shows a darker slaty brown colour typical of the disease. The mucous membranes are not pigmented and there are no especially dark areas round the pudendals which are so frequent. As usual axillary hair is absent and pubic hair scanty and fine. There are many senile warts on the abdomen and chest but these are not especially pigmented. The whole skin is dry, inelastic and loose because she has lost much weight. The conjunctivæ are muddy and dark in colour, but no unusual pigment is seen in the retinal fields.

The *liver* reaches three finger-breadths below the costal margin, is very firm, fairly smooth and slightly tender. There is no ascites, no suspicion of jaundice; van den Bergh, no chole-bilirubin, hæmo-bilirubin 0·6 unit. The spleen is not palpable. The fæces are normal and occult blood absent.

The *diabetes* is moderately severe but is well controlled by 44 units of insulin a day with a diet of 160 g. carbohydrate. Other points are the presence of peripheral neuritis, with absent knee- and ankle-jerks, and a few punctate hæmorrhages in the retina, the first I have seen in hæmochromatosis. The cardiovascular system is normal though extrasystoles are frequent; arteriosclerosis commensurate with age; blood-pressure 130/80 as an outpatient, 110/65 in bed.

The *blood-count* shows considerable microcytic anæmia. Red cells 3,600,000 per c.mm.; Hb. 75%; C.I. 1·04; white cells 12,000 per c.mm. (polymorphs 58·5%, lymphocytes 34·5%, eosinophils 1·5%, mononuclears 5·5%). Red cells show anisopoikilocytosis with occasional polychromasia and punctate basophilia. Basal sedimentation-rate = 18 mm. 1st hour (Fahrens).

The *sex history* is normal. She bore 2 healthy children in her fourth decade, menstruation started at 18 and was regular until the menopause at 50. This tends to show that she developed the disease unusually late in life since it interferes with sex function when it develops early. There is no family history of diabetes or other metabolic disease.

A *skin biopsy* was carried out on the left forearm, because although the clinical syndrome was clear I required the fullest proof that I had at last seen a female case of hæmochromatosis. The usual staining methods and chemical tests successfully demonstrated an increased deposition of melanin in the basal layer of the epidermis, and, more important, an iron-bearing pigment in the basal layers of the sweat glands, ducts and sebaceous glands. This deposit was nowhere heavy and always patchy, but proved the condition beyond doubt.

There is no established explanation of the sex distribution in hæmochromatosis, so preponderantly male. From a familial study I suggested[2] that it might be a sex-linked hereditary disease, transmitted like hæmophilia, but there has been no further proof or disproof of this. This is the oldest female case of hæmochromatosis so far recorded.

1. Sheldon, J. H. Hæmochromatosis, London, 1934.
2. Lawrence, R. D. *Lancet*, 1935, **2**, 1055.

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Reviews of Books

Fighting for Life

By S. JOSEPHINE BAKER, M.D. London: Robert Hale. Pp. 287. 10*s.* 6*d.*

Dr. Baker started on a medical career because she was obliged to earn her living somehow, but she lived to learn that "this profession demands not only stubbornness but a devotion so whole-hearted that it amounts to absolute consecration." She tells simply and clearly the story of her pioneer work in the realm of public health and child welfare in New York. As a medical inspector in the Department of Health she was oppressed by the toll of infant life, especially from summer diarrhœa, among tenement dwellers, and came to the conclusion that the proper way to keep people from dying was to keep them from falling ill. Choosing one of the worst districts of New York, she sent a well-trained nurse to every mother within a few hours of the birth of her child, to give simple instruction in the art of keeping a normal baby well. The result was a large reduction of summer deaths among infants in that district—a demonstration of the fact that heat did not necessarily kill babies. In that same year, 1908, a division of child hygiene was created, with Dr. Baker as its chief, and the first bureau of child hygiene in the world was well on its way. Now, after thirty years, the infant mortality-rate in New York has gone down from 144 to 50 per 1000 live births. Neonatal deaths and maternal mortality are still too high, but Dr. Baker, always a believer in prevention, thinks that much could be done by better prenatal care. She deprecates the ultra-specialisation of medical practice, and the virtual disappearance in America of the general practitioner, and she thinks that state medicine will prove the solution of the problem. She is credited with having saved the lives of 90,000 babies, but on the whole, she says, her work was strangely impersonal. She found great waste going on, and set out to prevent it.

A Method of Anatomy

(2nd ed.) By J. C. BOILEAU GRANT, M.B., F.R.C.S. London: Baillière, Tindall and Cox. Pp. 794. 33*s.*

IT is generally recognised that the teaching of anatomy in this country is showing signs of reorientation, and even anatomists themselves are becoming aware of the necessity for such a change if their subject is to continue to hold its high position in the medical curriculum. Briefly, this reorientation aims at training students to understand and apply the fundamental principles of growth and development, of structural differentiation, and of the anatomical basis of functional organisation, rather than demanding of him a drudging and unintelligent memorisation of factual details many of which will be shed after the examination. It remains true, however, that every student who aspires to medicine must acquaint himself with the general topography of the human body, even if he is no longer required to pay attention to minutiæ. There are various ways of teaching topographical anatomy. One method is to give the student a cadaver, a scalpel, a pair of forceps and a manual of practical anatomy, and tell him to get on with it, while at the same time he attends systematic lectures in which the descriptive anatomy of systematic textbooks is drearily regaled to him in colourless (and often meaningless) lists of relations, muscle attachments, surfaces of bones and so forth. This method makes little demand upon the teacher's intellectual capacity. A better method is well illustrated in Professor Grant's book, for which a new edition has been called. Here we find a successful attempt at teaching the data of gross anatomy by correlating them with each other and with functional processes, and by showing the student how they can be fitted together to give a real understanding of the organised and working machinery of the living body. By making every use of the emphasis offered by comparison and contrast, and by writing in a personal style, the author presents the gross anatomy of the human body as a lively study, and his book is illustrated by clear and striking diagrams. As a text-book of purely descriptive and regional anatomy the book is undoubtedly a success, and we can recommend its use to students, particularly to those whose visual memory is but poorly developed.

Therapeutics of Internal Diseases

Edited by GEORGE BLUMER, M.D., David P. Smith clinical professor of medicine, Yale University school of medicine. London: D. Appleton-Century Company. Vol. I, pp. 872; Vol. II, pp. 1042. Complete in four vols. £9 the set.

A BIGGER and better book than ever before has been Dr. Blumer's aim. There are twelve contributors to volume I, which deals at length with the principles of treatment and some technical methods. Nutrition, climatology, spa therapy, physical therapy, occupational therapy, use of gases, endocrine therapy, and serum and vaccine therapy are some of the chapter headings; intravenous therapy, blood-transfusion, spinal puncture and several other procedures are described and discussed. In volume II (19 contributors) there is a long section on the pharmacology of the important drugs, including local and general anæsthetics, then chapters on the treatment of all the diseases due to infection, each with its little diagnostic summary. Volumes III and IV will complete the textbook diseases. When such a wide field is to be covered—wider even than the title indicates—patchiness is almost inevitable, and there is considerable variation in the standard of different sections. There is also some repetition, but these faults do not hinder the work from being an impressive presentation of modern American thought and practice in therapeutics, well illustrated, documented and produced.

The Newer Nutrition in Pediatric Practice

By I. NEWTON KUGELMASS, M.D., Sc.D., attending pediatrician, Broad Street Hospital and Heckscher Institute, New York. London: J. B. Lippincott. Pp. 1155. 55*s.*

THE first section of this book is an outline of the principles of nutrition; the second deals with the development and feeding of healthy children; in the third almost all the diseases which affect children are considered from the nutritional aspect, most attention naturally being paid to digestive, metabolic and deficiency diseases. In such an ambitious work there is much to criticise, but Dr. Kugelmass has succeeded in writing a useful dogmatic book expressing his own opinions. As in most American books there are good bibliographic lists, mostly referring to American work but with a proportion of European names. Charts are used effectively, but the pictorial illustrations are only fairly good; thus there are eleven pictures of rickets but the typical radiological changes of the active stage are not shown. It is odd to find 56 pages taken up with tables of ketogenic diets, while only 13 are allowed for tables of normal diets and 14 pages cover the whole subject of constipation. The English is not beautiful but is often pithy—for example, "The only way to humanise cow's milk is to pass it through the mother."

Clinical Roentgenology of the Alimentary Tract

By JACOB BUCKSTEIN, M.D., visiting roentgenologist to the Bellevue Hospital, New York. London and Philadelphia: W. B. Saunders Company. Pp. 652. 50*s.*

THIS is a well-balanced account of pathological lesions of the alimentary canal as revealed by X rays, along with illustrative case-histories of patients which give a personal touch and make the book very readable. Reference to the work of pioneers on each subject provides an adequate historical background. In the comprehensive bibliography at the end of the chapters work done in this country however receives scant notice. In the description of pyloric stenosis, for instance, the hypertrophic form seen in adults is barely mentioned, without reference to Twining's important work. Dr. Buckstein apparently has no use for the preliminary films which we find useful to show detail of soft tissues in the investigation of alimentary-tract lesions, nor for plain films (i.e., without contrast medium) in intestinal obstruction. There is no mention of the thorium double-contrast enema and the little about the ordinary barium double-contrast enema is not adequate. But in general the illustrations are well chosen and clearly show the diagnostic points; they are also exceedingly well produced.

The book will rank as a standard work on its subject.

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THE LANCET

LONDON: SATURDAY, OCTOBER 19, 1940

SAFEGUARDING SLEEP

THE insomnia from which many people in bombed areas are suffering may be a symptom of a more general disturbance, but it can lead to an intensification of fatigue and anxiety—a vicious circle. Should the circle be broken by sedative drugs, as advocated by Dr. TAYLOR HARRIS in our correspondence columns last week? Sleeplessness among these people is the result of experience of the effects of immediate or remote bombing which has induced an emotional attitude towards certain stimuli, specially certain auditory stimuli. Noise alone does not keep people awake, once they have had a little time to recognise that it has no importance for them; the classical example is that of the mother who sleeps tranquilly next door to a goods yard but who wakes the moment the baby whimpers in the next room. She responds to the emotionally important noise but not to the impersonal loud noise. If a Londoner regards the guns as noises which do not concern him, he can sleep; if he has come to regard them as signals that his life is in danger, it is another story. It is the same with sirens warbling, German aeroplanes humming, shrapnel whistling; give them personal meaning for John Doe or Richard Roe, make them agents of dread, signals of descending death, and they will wake him from his sleep all right. Noises, however, are not the only things that keep people from sleeping soundly; discomfort, cold, hunger, unaccustomed company or unaccustomed loneliness, misery of every sort may do this, but the remedies for these are chiefly social. As far as noxious noises are concerned, the measures for safeguarding sleep are ear-plugs, deep and therefore sound-proof shelters, and sedative drugs. Ear-plugs are very well in their way, but there are many people who would prefer to hear the whistle or the whoosh of the bomb that was making for them; they believe, or feel, that they would then do something about it. Deep shelters are as yet luxuries for the few. There remain drugs.

As sedatives the bromides stood almost alone for seventy-five years, and large doses can be safely given for short periods. But unfortunately their cumulative effects are too serious to justify their prolonged use. For the past 25 years their pre-eminence has been challenged by the barbiturates, which were made available as long ago as 1898 by the work of NEBELTHAU. PURVES-STEWART and WILLCOX have warned us of the toxic effects of these drugs, but when they are used in the comparatively small doses needed to allay anxiety alarming effects are rarely encountered. The manifestations of idiosyncrasy, especially morbilliform rashes, are seen from time to time, but they are exceptional. Most physicians have had under their care epileptics who have taken four or five grains of phenobarbitone daily for a year or more without showing signs of poisoning. It is true that these people seem to be more tolerant to the drug than non-epileptics, but the observation suggests that the liver can cope with substantial amounts of barbituric-acid derivatives. Our timid use of these valuable hypnotics is largely attributable to that bogy of therapeutics, drug-addiction. Addiction is, in fact, a rare event when considered in relation to the enormous consumption of barbiturates all over the world.

The barbiturates of choice for the present purpose are those in which the side-chain is oxidised slowly so that a mild but sustained effect is produced. Phenobarbitone in doses of gr. ½ twice or thrice daily is particularly useful, but gr. 2 of sodium barbitone (Medinal) three times a day may be equally satisfactory. Apart from their portability—an important point when they are taken at work—a further advantage of barbiturates over bromides is their greater selective action on the centres controlling emotional tone; if the dose is carefully adjusted, general depression of the higher centres and association fibres is slight or absent, and the mental slowness and lethargy, the hangover common after therapeutic doses of bromides, are not seen. Experience in the treatment of peace-time anxiety associated with the struggle for existence and happiness gives grounds for the belief that the intelligent use of the barbiturates in war-time will help the many millions now facing the challenge from the air. They will take the edge off anxiety, give the highly strung tranquillity and self-confidence, and will send the weary to bed more hopeful that sleep will not be awaited in vain.

BIRTH OF A TRADITION

ONE day in March, 1838, Mrs. James Crichton of Friars' Carse stepped into her C-spring coach, painted yellow and black, and posted to Montrose. She was going to see Dr. W. A. F. Browne, and if she liked the look of him she meant to make him superintendent of the new Crichton Royal Institution, now almost complete. Her husband, Dr. James Crichton, had left a large fortune to be applied to such charitable purposes as she and her co-trustees thought fit, and after due consideration his bequest had been used to found at Dumfries a hospital for the humane treatment of the insane. Stories of past ill-usage of the mentally sick evoke in us the same disgust as accounts of an earlier barbarous penal code; to Mrs. Crichton they were commonplaces which many of her contemporaries contrived to ignore. She was one of those, like Elizabeth Fry, who could not rest comfortably in the knowledge of abuses; in the new Crichton Royal Institution the insane were to be regarded and used as sick people and the superintendent of her choosing must be a man who believed in that principle. Dr. Browne, resident physician at Montrose Royal Asylum, was young, but he had travelled and studied under Pinel and Esquirol and had written a book called "What asylums were, are and ought to be." She liked him on sight, gave him the appointment, and posted back to Friars' Carse in her yellow C-spring coach.

That was the beginning of a hundred years of sympathetic work for the insane, now commemorated in "The Chronicle of Crichton Royal" (Courier Press, High Street, Dumfries), by Dr. C. C. Easterbrook, superintendent of the hospital from 1908 to 1937. In a foreword, the late Sir James Crichton-Browne, whose astonishing longevity almost bridged the gap of a century, put down some memories of the hospital in the days of his father, the first superintendent. He recalls Mrs. Crichton "as a prim little lady in a black

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gown with a frilled collar and frilled widow's cap, of a somewhat sombre manner, as was the fashion of the time," but genial, kindly, well-informed and with a sweet voice. Her portrait, reproduced in the book, frilled collar and all, shows her with a pleasing douceness and an inquiring eye. Dr. Browne is there, too, and it is not difficult to see in his plain and kindly countenance the quality that assured Mrs. Crichton that his patients would be gently treated. Dr. Easterbrook has told the story of the hospital not as a connected narrative but as a collection of summaries under the headings of successive years. This has the advantage of making it easy to follow growth and change in the hospital departments: and change at Crichton Royal has always been growth in the best sense. The steady improvement in accommodation illustrates this very well; the hospital, as originally designed by Mr. William Burn, was to have been a three-story building carrying the stamp of a lingering Regency tradition; it was modified, however, and the building when completed though pleasing and spacious had lost much of the elegance and proportion of the original design. As the years go by we see this early building changing, dissolving, spreading, like a plant in one of those nature films which show you a life history in a few minutes. Here a piece of land is added, there a new building is opened to receive "pauper lunatics"; in 1852 new kitchens and bakeries are being built, in 1860 the heavy window guards and shutters are being removed, in 1867 the institution buys its own farm, in 1882 an ornamental tiled floor and Venetian blinds have found their way in. And so it goes on. Nowadays Crichton Royal with its many buildings and acres is what it always was—a mental hospital in the forefront of its kind, leading, not following in the rapid advance of work for the mentally sick.

SURGERY OF DYSMENORRHŒA

DYSMENORRHŒA is an economic problem, wasting many valuable hours of working time in young women. How great this wastage may be is pointed out by MILLER,[1] who calculates that 45% of all menstruating women suffer some discomfort at the menstrual periods, while 17% are seriously incapacitated for at least an hour every month and many for a longer period, sometimes for a whole day. In Canada the working time lost by women as a result of menstrual troubles amounts to 9000 days in the year. A number of useful women are deterred from going to work because of their liability to this recurrent incapacity. The textbooks of gynæcology offer a dispiriting prospect for a woman suffering from intractable dysmenorrhœa. She starts with analgesic drugs, working up from aspirin to the barbiturates, with perhaps a dash of belladonna thrown in, on the assumption that the pain is a visceral spasmodic cramp. She graduates to a dilatation, which offers generously to relieve in 50% of cases and to cure in 25%. If unsuccessful this may be repeated or she may be straightway promoted to a presacral neurectomy if her doctor is surgically minded; if he is organotherapeutically minded she undergoes a long and expensive course of œstrin or progesterone therapy. Meanwhile she has been advised by the distaff members of her family to get married and have a child, but this is no certain cure. As a last resort she is seen by a psychiatrist or by a surgeon who performs a subtotal hysterectomy. It is not surprising that many of these women are ultimately branded as neurotics.

The true nature of the complaint is concealed under a multiplicity of largely meaningless terms, which serve as a cloak for our real ignorance of the cause; thus we have primary, true idiopathic, spasmodic, virginal and even intrinsic dysmenorrhœa; these are separated from secondary dysmenorrhœa. This last is a more reasonable term and includes all those cases in which the pain first occurs in association with some definite organic lesion of the uterus or appendages, such as myoma, endometrioma and inflammatory diseases of the adnexa. The group of organic dysmenorrhœas is a separate entity and must be excluded from consideration here since cure follows the ablation or correction of the cause. This leaves a large group of so-called functional dysmenorrhœas in which a careful pelvic survey excludes uterine or adnexal abnormality. O'DONEL BROWNE[2] makes a strong plea for the subdivision of this class into uterine and ovarian dysmenorrhœa. He bases his arguments first on clinical grounds and secondly on a technique of exclusion by examination which he has devised himself; and he then correlates his conclusions with the physiology of the nerve-supply to the female genitalia. Clinically the uterus refers pain to the midline of the abdomen and always below the umbilicus. The character of this pain is a sharp stabbing or cramp—hence the term spasmodic dysmenorrhœa. It may also be a dull ache, but subject to exacerbations. Though often premenstrual, it may coincide with the flow, to cease an hour or two after its establishment; rarely it persists to the end of the menstrual loss. Ovarian pain, in contrast to this, may be unilateral or bilateral or even referred to a side opposite to the lesion; it is menstrual but chiefly premenstrual, always subumbilical, but for some queer reason chiefly on the left side and often radiating down the thighs. Nausea, dyspareunia, dyschezia and even fainting attacks are inconstant symptoms. Diffuse lower abdominal pain, central and lateral, suggests a mixed uterine and ovarian origin. O'DONEL BROWNE separates these two distinct types of pain by compressing each ovary in turn between the examining fingers. If this manœuvre faithfully reproduces by a deep-sensibility reflex the type of pain that the patient knows as dysmenorrhœa, then the ovary is the origin. He then passes—without anæsthesia, but with full aseptic ritual—a uterine sound, and gently stimulates the endometrium of the uterus in all directions with its blunt point. The nature of the pain evoked is carefully noted and if it mimics the pain of the patient's dysmenorrhœa the uterus is concluded to be the origin. It is important not to grasp the cervix with a vulsellum but to conduct the whole procedure with great gentleness. The sound can be passed blind if a small Cusco's speculum is impracticable. Any gynæcologist of experience will agree that this examination is quite feasible. The origin of the pain can thus be attributed to uterus alone, ovaries alone, or both. Surgical correction can be achieved by interrupting

1. Miller, N. F. *Canad. med. Ass. J.* 1940, 42, 349.

2. Browne, O'D. T. D. *J. Obstet. Gynæc.* 1939, 46, 962.

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the nerve path, which is now recognised to be separate for ovary and uterus. The ovarian innervation is bilateral and chiefly sympathetic, being derived from the renal, intermesenteric and cœliac plexuses. The ovarian nerves are two or three in number and their terminal ramifications end outside the theca externa of the follicle; they pass no further, the membrana granulosa being nerveless. These sympathetic fibres are vasoconstrictor; a few parasympathetic fibres provide a poorer and weaker vasodilator supply. The vasomotor effects of surgical denervation of the ovary are fortunately few, if any, because the hormonal control attends to the proper function of the ovarian cycle. Fertility and pregnancy are not adversely influenced; only two of O'DONEL BROWNE'S cases married after ovarian denervation, but each has subsequently been successfully confined.

In all cases of primary dysmenorrhœa in which he opened the abdomen, O'DONEL BROWNE found sclerocystic disease of the ovary, and he suggests that this is accompanied by perifascicular and intrafascicular nerve degeneration similar to that found in the presacral nerve in connexion with uterine dysmenorrhœa. This pathological change has been investigated and discussed by DAVIS.[3] As a control, O'DONEL BROWNE examined the ovarian nerves of women undergoing hysterectomy who were known not to suffer from dysmenorrhœa, and in no case did he find a comparable nerve degeneration—a point which must be confirmed if possible by other workers. He explains the cyclic nature of the pain as being due to the pressure on the diseased nerve-endings caused by premenstrual œdema. If the pain is more constant it is thought to be due to fibrosis in the region of the nerve-endings. He discusses the time-honoured cervical stenosis, so specious a cause of dysmenorrhœa in our fathers' and forefathers' time. Of all the cases he has examined for dysmenorrhœa only 1–2% had a genuine narrowing of the cervical canal. If a woman suffers from such severe menstrual pain as to warrant surgery after the failure of reasonable medical treatment, and if it is decided that she has ovarian dysmenorrhœa, the nerve path for her pain impulses must be destroyed. L'HERMITTE and DUPONT[4] realised that this denervation must be bilateral, and they now advocate a division of the main ovarian nerve bundles in the mesovarium without interfering with the blood-supply. O'DONEL BROWNE divides both infundibulo-pelvic ligaments, vessels and all, at the brim of the pelvis and securely ligates them with silk. The stumps at each side are sutured together distal to the silk ligature to prevent ovarian prolapse. The ovary is in no vascular jeopardy after this division; the medial stump if unligated shows free arterial bleeding from the uterine anastomosis. A presacral neurectomy, appendicectomy or Gilliam's operation is performed according to the merits of the case. Of 16 cases so treated by O'DONEL BROWNE 10 are complete cures, while 6 are classed as failures. Of these 6 no less than 4 were unsuitable, 1 having endometrioma, 2 salpingitis and 1 tuberculosis. The corrected cure-rate is 5 in 6, a refreshing figure for any treatment of dysmenorrhœa. O'DONEL BROWNE'S denervation should be tested and reported on, so that we may know whether we have, if not the solution, at least a line of sound surgical attack on this problem.

3. Davis, A. A. *J. Obstet. Gynæc.* 1933, **40**, 480.
4. L'Hermitte J. and Dupont, R. *Gynéc et Obstét.* 1927, **15**, 161.

Annotations

BIRTHDAY IN THE CRAFT

MEDICAL journalism is an old trade, going back perhaps to the famous code of Hammurabi, King of Babylon, who believed in punishing malpraxis by death and said as much in print. Medical journals, however, have not on the whole been notable for longevity. In the last century many mushroom ventures died, generally because they failed to fulfil promises made in a spacious mood at the start. Recently we had an opportunity in the columns of the *British Medical Journal* to congratulate our crony of a hundred years on a long and honourable life; this week we take pleasure in continuing those congratulations at more length. Birthdays, which loom so large in childhood, sink into welcome obscurity in middle age and only become subject for fresh enthusiasm when they indicate a high survival value. In medical journalism, as we have suggested, survival depends on the honest fulfilment of obligations—a criterion which might be extended to the human race with advantage. When Sir Charles Hastings founded the Provincial Medical and Surgical Association, its transactions were published annually; but in 1840 the association founded a weekly, the *Provincial Medical and Surgical Journal*, which later changed its name to the *Association Medical Journal*, and finally, in 1857, to the *British Medical Journal*. Allowing, then, for these nursery names the journal has achieved its century. If we can accept the old saying that the first hundred years is the worst, the future of our friend and rival will be of formidable brilliance, and it is comforting to reflect that being well launched on our own second century we share the same happy augury. But there are institutions to whom this birthday-consciousness—even for birthdays a hundred years apart—no doubt seems juvenile and immature. The colleges of our older universities, for example, might smile at such salad enthusiasms. When THE LANCET and the B.M.J. of three hundred years hence salute each other they will do it more casually. But speaking, as we do, in pinafores we are happy to think of a hundred years of sound medical record and criticism completed and we offer our best wishes for the centuries to come.

WHAT IS LEUKÆMIA?

THE nature of human leukæmia is unknown and we still take cover in such meaningless clichés as the dim borderline of malignancy to hide our ignorance. There are three common theories—that it is caused by an unidentified infecting agent; that there is a metabolic upset from an excess, deficiency or abnormal formation of an internal secretion; or that the disease is a variety or perhaps varieties of malignant neoplasm. For each of these views there is circumstantial but little direct evidence. Among oblique methods of approach are the study of the chemical and cellular metabolism, the influence of heredity and various forms of trauma in animals and the behaviour of the pathological cells in tissue culture. Much work by reliable witnesses is on the side of the neoplastic theory but there are still many points to sort out. There is the widespread and so far as we know simultaneous involvement of many parts of the hæmopoietic system, the great differences in the clinical course of the disease, and the point made by Naegeli that infiltration of muscle by leukæmic cells destroys by compression and never by direct invasion. An explanation of these points is necessary, for until we can concentrate our efforts on a single and useful line of thought the chances of progress are poor. Tissue culture should

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offer hope, since the behaviour of malignant cells under these conditions is becoming fairly familiar. But Forkner[1] says that tissue culture has done little for our knowledge of the pathological physiology of the disease and nothing to lessen the diagnostic difficulties. Nevertheless Israëls[2] has reopened its possibilities by cultivating the bone-marrow in vitro from patients with various forms of leukæmia and watching the development of the pathological cells. He believes that leukæmic cells in culture develop in a manner resembling the normal. After a fortnight's culture he found that a majority of primitive or embryonic cells was converted to a majority of more mature types, and that in marrow from myeloid leukæmia myelocytes, metamyelocytes and young polymorphonuclears were predominant with mitosis still going on among the myelocytes. Cultures from the bone-marrow of patients with monocytic leukæmia showed after a fortnight almost all the cells to be mature phagocytic monocytes. It has already been shown that lymphocytes treated in a similar way tend to remain more or less stationary. The implication of Israëls's work, however, is obvious, and as he says the leucocytes in human leukæmia do not show in vitro the rapid mitotic division nor the fixity of type noted in the cell of the transmissible leukæmias. He points out that the evidence that leukæmia is a malignant new growth rests largely on studies of the transmissible leukæmias of fowls and rodents, and these as Ewing emphasised are not identical with or even strictly analogous to the human varieties. The fact that human leukæmic cells may in favourable surroundings develop into terminal types which no longer divide by mitosis gives a reasonable explanation of the repeated failure to transmit human leukæmia either to other people or to animals. We are still far from an explanation of the nature of human leukæmia, but it is progress to signpost the primrose paths of speculation and false analogy.

RHEUMATOID ARTHRITIS AND VITAMIN D

A GROUP of workers at the University of Illinois college of medicine has become interested in the treatment of rheumatoid arthritis with large doses of vitamin D, as a sequel to a single chance observation. At the allergy clinic of the university cases were under treatment with such doses of vitamin D and among the allergic subjects happened to be two with rheumatoid arthritis. These both reported alleviation of their joint pains while under treatment, and from this occurrence has sprung a large body of research and a form of treatment which has met with considerable success. Reed, Struck and Steck, have now published a progress report in the form of a book,[3] the first part of which sets out established knowledge of vitamin D; subsequent chapters deal with the relation of vitamin D to the parathyroid glands, the toxic effects of vitamin D and the effects of vitamin D on mineral metabolism. The influence of vitamin D on energy metabolism is also considered; experimental data on this part of the subject are scanty but the field is an important one from the standpoint of this work, since treatment with thyroid extract is often useful in rheumatoid arthritis. Two conclusions are tentatively suggested: first, that pure vitamin D becomes toxic only when, through gastrointestinal disturbance or other causes, it becomes decomposed into toxisterol; and secondly that the effect of vitamin D on energy metabolism and thyroid function is mediated through the thyrotropic mechanism of the anterior pituitary.

1. Forkner, C. E. Leukemia and Allied Disorders, New York, 1938.
2. Israëls, M. C. G. *J. Path. Bact.* September, 1940, p. 235.
3. Vitamin D. By C. I. Reed, Ph.D., associate professor of physiology, H. C. Struck, M.S., associate in physiology, and I. E. Steck, M.S., M.D., instructor in physiology and in medicine, University of Illinois college of medicine. U.S.A.: University of Chicago Press; London: Cambridge University Press. Pp. 389. 27s.

The authors summarise the treatment of rheumatoid arthritis with vitamin D as follows. "A group of forty-five cases of atrophic arthritis, seven cases of hypertrophic arthritis, and three mixed cases were treated with 150,000–200,000 units of vitamin D daily with definite measurable improvement in 74·5% of cases, as manifested by reduced swelling and pain, increased mobility (active and passive), improved muscular tonus, and weight gain." It is notoriously difficult to assess improvement in rheumatoid arthritis; pain is not necessarily proportional to deformity, so that one of the main criteria of improvement is subjective. Spontaneous remissions are common and the disease is influenced by climate and season, but the success achieved with vitamin-D therapy does seem to lie outside the normal fluctuations of the disease. It is remarkable, however, that only these enormous doses were tried. It is true that they were scarcely ever found to be toxic and improvement accompanied their use, but no attempt seems to have been made to ascertain the effect of moderate physiological doses over long periods. The authors definitely reject the view that vitamin-D treatment is specific and say that "there is no implication that vitamin-D deficiency is an etiologic factor in the development of arthritis," but they give no clear reason for their attitude. Certainly vitamin D in large and smaller dosage deserves an extended trial in this country, where rheumatoid arthritis is the commonest cause of chronic subacute pain and partial crippling.

ADRENAL HYPERTROPHY IN INFANTS

Dijkhuizen and Behr[1] have described what they claim to be a new clinical entity of the neonatal period. Four young infants developed violent vomiting, passed thin green stools or were constipated, and were diagnosed as cases of intestinal stenosis. All died. In three, two boys and one girl, post-mortem examination showed great hypertrophy of the suprarenal glands, one baby had bronchopneumonia as well, none had intestinal stenosis. In the fourth case, a pseudohermaphrodite, brother of one of the other children, no autopsy was done. Dijkhuizen and Behr are unable to explain the symptoms, but they mention five similar cases, which are on record. In addition, post-mortem specimens from two cases have been shown by Ellis[2] and Evans[3] at the Royal Society of Medicine. On the face of it there seems to be a real connexion between enlarged suprarenal glands in the infant and the clinical events—vomiting, dehydration, collapse and death—and the Dutch paper should attract attention to the connexion, whose nature has yet to be explained. There are interesting clues: the frequent but inconstant male or female pseudohermaphroditism, inconstant perhaps because the glandular enlargement does not always start at the same period of intra-uterine life; the presence of peculiar giant cells in the internal cortical zone in one of the Dutch cases and in some sclerotic adrenals in Addison's disease; urinary abnormalities—"hæmorrhagic nephritis" without post-mortem changes in the kidney,[4] albuminuria and occasional cylindruria and hæmaturia with a raised blood-urea,[5] albuminuria and glycosuria with minor changes in the renal glomeruli and the convoluted tubules,[3] and the occurrence of albuminuria with nitrogen retention and of glycosuria in adult patients with phæochrome tumours.[5] Detailed biochemical studies are not easy in small infants who are gravely ill, but might be as fruitful in this uncommon disorder as they have been in Addison's disease.

1. Dijkhuizen, R. K. and Behr, E. *Acta pæd.* 1940, **27**, 279.
2. Ellis, R. W. B. *Proc. R. Soc. Med.* 1933–34, **27**, 401.
3. Evans, P. R. *Ibid*, 1937, **30**, 1190.
4. Hammer, *Ned. Tijdschr. Geneesk.* 1937, **81**, 3201, quoted by Dijkhuizen and Behr.
5. Goldzieher, M. A. The Adrenals, London, 1929, p. 220.

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BONE-MARROW BIOPSY IN CHILDREN

So many hæmatological puzzles occur in children that it is not surprising that efforts have been made to adapt the sternal-puncture methods suitable for adults for use on children. The chief difficulty is that ossification of the sternum is only beginning at birth and the sternum remains segmented for some time. Diwany [1] has now described the precautions that must be taken when performing sternal puncture in children, and, with illustrations of the progress of ossification, defines the best sites. He emphasises rightly that great care must be taken and a guard arranged on the needle to limit penetration to a known degree. Lichtenstein and Nordenson [2] working on premature infants used puncture of the diaphysis of the tibia as an alternative site. Diwany only examined a small number of children and it is not surprising that there is much variation in his results. Larger series have been reported by Kato [3] and by Vogel and Bassen.[4] All agree that as age increases the proportion of erythroblasts decreases steadily, and none found true megaloblasts present even in infants. The reported variations in the percentages of the different cells make it clear that larger groups will have to be studied before the normal marrow picture at different ages is adequately defined; the range of normal limits will certainly be large. In the meantime these descriptions should stimulate the study of marrow changes in the blood diseases of children, and the method gives a reasonable hope of obtaining information that will help to bring about a better classification of the many puzzling blood-pictures found. Probably repeated punctures will be needed since the blood-forming tissues of children seem very labile; for this reason it will probably be found better to use a needle of smaller bore than the standard Salah needle.

TUBERCULOUS INFECTION IN CHILDHOOD

CHILDREN have shared in the striking decline in mortality from tuberculosis during the last fifty years. In a recent review [5] H. C. Cameron attributes this mainly to the diminished risk of contact with infective human adults and in lesser degree to control of the bovine disease and to more pasteurisation of milk. Not only has mortality declined but there is evidence of less frequent infection. It is no longer true that sooner or later every child reacts to tuberculin. The old figure of 80% Pirquet-positive among Viennese children has sunk to 40% in children over ten, and recent large-scale investigations have found only 10 to 15% positive reactors in the child population of some American cities. But that gives no ground for complacency. A better understanding of childhood infection would reduce the incidence still further. Cameron traces the natural history of the disease in the young. There is the stage of primary infection, insidious with often little tissue reaction; in the infant this is a danger period, for the infection may prove overwhelming. Bacillæmia resulting in miliary tuberculosis and meningeal involvement may follow in the fourth to sixteenth week after primary infection. Older children mostly pass the stage of primary infection unscathed, to face the second danger period of adolescence when it is still hotly debated whether the reinfection is exogenous or endogenous. If from without then it is of supreme importance for all positive reactors to be screened from contact with infectious adults. It is important also to distinguish between the household and the family in seeking for possible sources of infection. As Margaret Macpherson has pointed out,[6] a routine history of the health of father, mother, sisters and brothers may give the impression of a healthy family, but it gives no clue to the presence of a grandfather sitting all day at the fireside with so-called chronic bronchitis—which, in reality, is a senile type of tuberculosis giving rise to sputum rich in tubercle bacilli; nor will the family history include the lodger wth cough and sputum who has recently departed to enter a hospital and from there has gone on to a sanatorium. Cameron discusses the recognition of primary infection. Symptoms are minimal or absent. The physical signs found in adult forms of tuberculosis do not occur. Erythema nodosum may give a warning but the suspicion of primary infection is usually based on vague ill health leading to investigation along three lines: a tuberculin reaction, X-ray examination of the chest (in which transitory shadows may be found), and a determined search for tubercle bacilli in stomach wash-outs. If positive evidence of infection is obtained in any of these ways the child should be placed in conditions where the risk of further infection is minimal. The younger the child the more important is this segregation. Miriam Brailey has shown in a recent survey [7] at the Johns Hopkins Hospital that when contact infection has occurred the highest case-fatality is in infants under one year. Her studies show the complexity of the problem. In a series which included both white and coloured children in contact with adult infection the risk of dying from tuberculosis was three to four times greater for the coloured children than for the white. We are left wondering whether this is due to racial susceptibility or to differences in nutrition and hygiene.

CHEMOTHERAPY AND MENINGOCOCCAL CARRIERS

THE action of the sulphonamide drugs is most striking when susceptible organisms are actively multiplying in the blood or tissues. Even in culture media containing sulphapyridine, as Finland and his colleagues [8] have shown in the case of the pneumococcus, the organism must multiply before the drug can act. Does the meningococcal carrier state comply with this condition of successful chemotherapy? Meningococcal carriers are of various kinds. Many are temporary carriers for a few days or weeks owing to contact with another carrier or a patient suffering from the disease. Repeated reinfections in this way are not uncommon, and in times of epidemic prevalence individuals who are constantly exposed to infection may exhibit such an intermittent carrier state over long periods. It is important to differentiate between the carriers of parasitic or epidemic strains, mostly group I, and those of group II or anomalous strains which are mainly saprophytic. In epidemic times both contacts and non-contacts of cases in a community where the disease is occurring often harbour group-I strains. It seems probable that the organism maintains itself in most of such cases by a process of slow multiplication on the surface of the mucous membrane of the nasopharynx or in the pharyngeal tonsil. This may happen without clinical evidence of pharyngitis, and indeed it is still not known whether the pharyngitis which may precede the onset of meningitis is due to the meningococcus or to other organisms. Such carriers may well be susceptible to chemotherapy. There is, however, a more chronic type of carrier, often with abnormalities of the nasopharynx, who harbour, apparently continuously, the relatively avirulent group-II strains for months or years. These are always with us, at all seasons and irrespective of epidemic prevalence. In some of them the organism may be maintaining itself saprophytically in secretions with little multiplication

1. Diwany, M. *Arch. Dis. Childh.* September, 1940, p. 159.
2. Lichtenstein, A. and Nordenson, N. G. *Acta Pædiatr., Stockh.* 1939, **24**, 57.
3. Kato, K., *Amer. J. Dis. Child.* 1937, **54**, 209.
4. Vogel, P. and Bassen, F. A. *Ibid*, 1939, **57**, 245.
5. *Guy's Hosp. Gaz.* Aug. **24**, 1940, p. 242.
6. *J. R. Inst. Publ. Hlth*, August, 1940, p. 201.
7. *Milbank mem. Fd. quart. Bull.* 1940, **18**, 222.
8. Spring, W. C. Jr., Lowell, F. C. and Finland, F. *J. clin. Invest.* January, 1940, p. 163; Finland, Spring and Lowell, *Ibid*, p. 179.

and out of reach of the blood-stream. There would be little hope of clearing up these by chemotherapy, but fortunately they are the least important.

Controlled observations on the effect of chemotherapy on large numbers of carriers of various types, differentiating the organism, are now urgently required and are indeed the only way to settle the question. Meehan and Merrillees[9] have provided some data which appear to warrant further investigation on controlled lines. In a group of 60 children, part of the population of a foundling hospital, there were 30 cases in six outbreaks, spread over a period of 2½ years or 3 seasons. Attempts at isolation of cases and carriers failed to prevent the appearance of new cases. In the institution 75 carriers were discovered, mostly in the affected group. Sulphapyridine was then given to all the carriers, in doses of 1 gramme daily per 14 lb. of body-weight for five days, and this course was repeated after five days; there was an immediate drop in the number of carriers from 75 to 6, and ultimately to 3, after two repetitions of the courses. The most satisfying event, however, was that no further case of the disease had appeared up to the time of writing, a period of a year. It may, of course, be objected that the period of immunity from the disease is too short to be conclusive, that there was no typing of the organisms, and no controls. Nevertheless, prima facie, there appears to be a case for further trial of chemotherapy with carriers, especially in a closed community. To deal with carriers generally on these lines would introduce formidable difficulties, for the doses used were large and probably unsuitable for ambulant people not under skilled observation.

THE FORMATION OF AQUEOUS HUMOUR

ONE of the most tantalising riddles of physiology is the way in which the body manipulates its fluids.[10] The sheet anchor of any theoretical approach is the idea of the semipermeable membrane, one type of which, allowing the transfer of water but not of dissolved salts, we used to try to make at school by precipitating copper ferrocyanide in the walls of a porous pot. A collodion sac goes a stage further in allowing the passage of dissolved inorganic ions but not larger molecules such as proteins. Since proteins are as a rule combined with ions the natural tendency of the latter to distribute themselves evenly throughout the water on the protein and non-protein side of such a membrane is disturbed by the affinity of some of them for the protein. When the system has reached stability the relative concentrations of the various solutes and their components accord with the law known as the Donnan equilibrium. The behaviour of many biological membranes approximates to that of collodion, but almost invariably there are reservations. Although lymph contains some protein its relation to blood is largely determined by the foregoing considerations; but one must keep a wary eye on a "membrane" (the capillary wall) which often allows blood-cells to pass through it. Then there are membranes with idiosyncrasies—that of the erythrocyte, for instance, very competently holds potassium ions inside and keeps out sodium ions, but chloride and bicarbonate ions pass freely. In examples like this there is no suggestion that the membranes are other than passive, or that it is necessary to do more than achieve an understanding of their inherent properties, always bearing in mind that these may be influenced by a change in the immediate environment.

In other cases membranes are definitely not passive. In the blocked duct of a salivary gland the fluid pressure may exceed the arterial blood-pressure; this means that the cells of the alveoli have done something more than passively transmit substances from the blood, via the tissue fluid, to the duct. They are active. Similarly, in the kidney, the selective excretion of some blood constituents, the conservation of others in mutually varying proportions and the high concentration of the urine, show that the tubule cells are active and not passive. In the last few years there has been much interest in the aqueous humour; first accepted as a secretion of the ciliary glands, then as a transudate, more recently again as a secretion, it clearly demands the careful investigations carried out by Duke-Elder, Quilliam and Davson.[11] Until this point is settled theories of glaucoma must rest on an insecure foundation. These workers, who have unfortunately been interrupted by the war, have collected sufficient results to warrant a review of the whole question, although they are unable to give a final answer to it. Their contention, based on careful comparative estimations of significant constituents of aqueous humour and serum, is that "the variations from expectation are neither so large nor so consistent as to warrant the supposition of a secretory activity." Moreover, results obtained from eyes poisoned by cyanide and from dialysis of serum through a collodion sac led them to similar conclusions. The behaviour of such inert systems does not approximate sufficiently closely to that of the living eye to prove a purely physical process, but it is similar enough to make the postulate of secretion questionable. The findings of these workers are against recent trends, but they have mobilised sufficient evidence of a critical kind to justify a stay of judgment.

PSORIASIS UNCONQUERED

MANY methods of treatment for a disease imply that none is effective. There is no specific remedy for psoriasis, but this does not mean that the unfortunate patient can get no relief from his affliction. Probably the time-honoured method of applying an unguent containing tar to the patches, after removing the scales in a hot bath, and of giving him a small dose of arsenic by the mouth is still as good as anything. From time to time, however, elaborate remedies are suggested and in a stimulating paper Madden[12] deals with some of the more modern of these. He treated 112 patients with psoriasis over a period of 2 years with one or other of the following remedies: vitamin D, which proved valueless; vitamin B_1, which improved a few but failed to cure their relapses; liver extract and dilute hydrochloric acid, which were of no striking value; œstrogenic substance, which failed; bismuth salicylate in oil, which caused a slight improvement in a few cases; a low-fat diet combined with vitamin B_1 and liver extract, or anterior pituitary extract, or adrenal cortex extract, all of which helped in some cases but probably not more than the low-fat diet on its own would have done; vitamin-B complex, brewer's yeast, vitamin C, sulphanilamide, anterior pituitary extract, and adrenal cortex extract, all of which were useless. It is healthy to receive a negative report of this kind on a series of vaunted and unproven remedies.

THE committee set up at the end of July, under the chairmanship of Lord Horder and the vice-chairmanship of Surgeon Rear-Admiral G. Gordon-Taylor, to consider the protection of the fighting services in the field has been collecting evidence. An interim report has now been prepared and has been forwarded to the Prime Minister and the ministries interested.

WE regret to announce the death on Oct. 8 in his eightieth year of Sir HENRY HEAD, F.R.S., consulting physician to the London Hospital and former editor of *Brain*.

9. Meehan, F. and Merrillees, C. R. *Med. J. Aust.* July 27, 1940, p. 84.
10. *Lancet*, 1940, 1, 794.
11. Duke-Elder, S., Quilliam, J. C. and Davson, H. *Brit. J. Ophthal.* September, 1940, p. 421.
12. Madden, John F. *J. Amer. med. Ass.* Aug. 24, 1924, p. 588.

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Public Health

MASS INOCULATION AGAINST THE TYPHOID GROUP

BY H. C. MAURICE WILLIAMS, M.R.C.S., D.P.H.
MEDICAL OFFICER OF HEALTH FOR SOUTHAMPTON

THE Southampton borough council is, I believe, the first public health authority to establish public clinics where inoculation against the typhoids is offered free to any person living within the borough boundaries. At the beginning of the war I advised my public-health committee to apply to the Ministry of Health for permission to establish such clinics, but it was not until a recent circular letter from the chief medical officer was received advocating this procedure, that I was able to do more than arrange for all the medical, nursing, and domestic staff in the municipal hospitals and institutions in my area to be protected, together with the staff of a voluntary hospital.

It did not need much imagination to visualise the public-health problem that would be encountered in vulnerable areas when indiscriminate bombing began. Water mains and sewers often lie close to each other, and if both were fractured pollution of water would be probable. Chlorination at the source does not leave enough residual chlorine to have any effect on the water in distant mains. In initiating the scheme, I invited members of the local medical advisory committee to discuss the question, and I was promised the coöperation of the local practitioners. The town being divided by a river, I decided to establish a centre on each side of it, holding an afternoon and an evening session at each. The centres are in the school clinic buildings. An advertisement of the scheme was inserted several times in the local press. This announced that the council had decided to provide clinics for the protection of the population against the typhoid group of fevers, and asked those wishing to be inoculated to attend at one or other of the clinics between stated hours, when inoculation would be administered free of cost by one of the council's medical officers. Similar advertisements are being exhibited in all the trams and buses owned by the corporation, and in the local cinemas, through the kindness of the proprietors.

I asked all the chief officers of the corporation departments to submit a list of members of their staffs who desired to be inoculated. Wardens distribute from house to house in their districts a letter indicating the advisability of inoculation. Similar facilities have been offered to the staffs of first-aid posts and other A.R.P. depots, as well as to industrial establishments. To save them the inconvenience of attending at a clinic I have offered to send a medical officer to carry out the inoculations at their place of employment.

Private practitioners in the town have been informed by a circular letter that on making a request to the public-health department they will be supplied with 25 c.cm. of vaccine when they are able to collect 15 patients. The vaccine is supplied free, and the public-health department asks that records similar to those filed at the clinics should be kept and returned on completion of the 15 cases. One side of the record cards used is ruled under headings to show the name, age, address, occupation and history of the patient, the dosage and other treatment he receives, his reactions, and the signature of the doctor giving the injections; on the reverse is the following short certificate to be signed by the patient.

I wish to have myself/my child..... inoculated against the typhoid group of fevers by the means which the medical officer of health or his representatives consider most suitable. I understand that inoculation sometimes produces local or general reactions which may temporarily incapacitate, but I agree that the mayor, aldermen and burgesses of the Borough of Southampton, or any of their officers, shall not be held responsible for any such reactions or incapacity or any loss in consequence thereof or arising thereout.

Accompanying Sir Arthur MacNalty's circular letter the Ministry of Health issued instructions relative to dosage and procedure. During the first two weeks 804 people attended at both clinics for their first injection. The number would undoubtedly have been greater but for the fact that during two of the sessions an air-raid warning was in operation. Twelve 25 c.cm. bottles have already been issued to private practitioners, which covers an anticipated number of 180 patients. Before the end of the present month I anticipate that we shall have completed the protection of 2000 people, and before the end of the year we hope to have protected 10,000.

The vaccine, which is being supplied through a Government laboratory, contains 1000 million *Bacillus typhosus*, and 500 million each *B. paratyphosus* A, B and C per 1 c.cm. It is administered by two injections of 0·5 and 1 c.cm. for adults, given at an interval of 14 days.

On occasions when we have suspected that the water in certain mains has been polluted, we have immediately dispatched a health-department van with a loud-speaker attachment to warn the residents in the particular roads affected. This is in addition to a public notice which frequently appears in the press warning all persons to boil their water following a raid until such time as the medical authorities are able to indicate that there is no pollution.

I have to thank Dr. J. T. Duncan of the Government laboratory for his advice.

Mosquito Control in England

THE Ministry of Health has at length recognised that, apart from the rôle they play in malaria, the small biting insects known as mosquitoes or gnats are a great public-health nuisance, and has issued a memorandum on mosquito control.[1] Advisers to local authorities, to whom the memo is chiefly addressed, will be somewhat alarmed at the extent and character of the measures suggested and may feel reluctant to advise their authorities to adopt them. Indeed, if all the recommendations were presented to a council for adoption the matter would be allowed to lie on the table and nothing would be done. But if the memo is read carefully, especially by someone acquainted with entomology and who has had personal experience of biters in his own locality, it will be seen that what may be required locally to stem the menace is well within practical possibility.

When Ross had proved that the mosquito was an obligatory conveyor of the malaria parasites it seemed that a comparatively easy means was available to free mankind from what is, and probably always has been, the greatest menace to human health. But many species of anopheles, differing widely in habits and habitats, can harbour the plasmodia, and experience has shown that measures satisfactory in one locality are useless in others, and that what succeeds at one time and against one species of anopheles fails at other times and against other species. So the control of malaria has fallen mainly into the hands of entomologists who by studying the natural history of the mosquitoes can find out ways of attacking the various species when, where and how they are most vulnerable.

In Britain we have 29 species of anophelines and culicines, several of which can convey malaria, but of recent years only one variety of one species, *Anopheles maculipennis atroparvus*, has had much say in causing native malaria. Since the last war some 500 cases of malaria proved to be locally contracted have occurred in Britain. Most of them were detected in 1917–22 in the low-lying coastal districts of east and south-east England where the offending mosquito is most common, and were due to the return of soldiers infected abroad.

The Ministry of Health is now less concerned with the risk of malaria than with the annoyance, loss of health and interference with labour caused by the bites of all anophelines and culicines which are natives of this country and fond of man. Of the 29, only 21 are of much consequence, and these are locally distributed, so it is rarely necessary to wage war on more than a few species. The damage done to man by the insects is solely through the bites of the adult females. These ladies are somewhat capricious in their choice and do not attack all humans indiscriminately, but few if any people are not favoured by some species and many are attractive to all. It is possible that those exposed to continuous biting develop a partial immunity, for newcomers to a

1. Memorandum on Measures for the Control of Mosquito Nuisances in Great Britain. By Lieut.-Colonel J. A. Sinton, V.C., M.D., adviser on malaria to the Ministry of Health, and P. G. Shute, F.R.E.S., Assistant adviser. H.M. Stationery Office. 6d.

district seem to suffer more severely than old residents, and townfolk when they go into the country appear to be the worst bitten; or perhaps they only make most fuss about it. No doubt the increase of gardening and allotment cultivation has brought gnat-bites into prominence. The main trouble with these is that their itching prevents the victim from sleeping, but they may be infected at the time of their infliction, and have been known to be the starting point of erysipelas or scarlet fever.

An essential preliminary to mosquito control is identification of the species which is topically and locally prevalent. Medical officers of health can be expected to arrange for the collection and transmission of specimens, but not to identify them; this will be done free of charge either by the Ministry of Health Malaria Laboratory, Horton Hospital, Epsom, or by the Entomological Department, Natural History Museum, South Kensington. Having identified the species, the best means of attacking it can be found by reference to the memo. It is important to pay attention to the times of the year at which the various measures should be employed, for insects are punctual in their habits. Ingenuity and local knowledge are required to bring the work within feasible limits. Broadly speaking, the British anophelines and culicines are either woodland or coastal species, the former breeding in forest pools or puddles and the cavities of hollow trees, and the latter in marshy pools. All species show some predilection for certain breeding grounds which can be turned to advantage by those who know the locality. Two species which like brackish water—*Aedes caspius* and *Aedes detritus*—are apt to be a serious nuisance in coastal districts, and since their breeding places are numerous and may cover wide areas there is little hope of suppressing them without extensive drainage or reclamation schemes. These species have been particularly vicious this year, probably because their breeding grounds have not suffered by the long dry summer. The woodland species have had a less easy time owing to the drought, so the coming months will be favourable for an onslaught on their larvæ.

Something valuable can be done in reducing mosquitoes by attacking the adults when they are hibernating. As the weather gets cold many specimens of mosquitoes (the females only) enter buildings to pass the winter. They like pigstyes, cow sheds, outbuildings, cellars and outside w.c.'s, and prefer places which are dark and dirty and amply decorated with cobwebs. They can be killed by spraying, but vast numbers can be destroyed by sweeping. Here the housewife can help materially by carrying out her spring cleaning in November when the mosquitoes have retired to roost, instead of waiting until Easter when they will have departed for their breeding grounds.

Sophistication of Foods and Drugs

The report for 1939 of Mr. H. H. Bagnall, B.Sc., analyst to the city of Birmingham, reveals the infrequency and uninteresting character of modern food sophistication. Of 5352 samples of foods examined, 295, or 5·5% were found "incorrect," of which 239 were watered milk, 5 watered spirits, 17 margarine substituted for butter, and 7 steak and kidney pies lacking kidney. These are the only food offences which are at all common now, apart from faulty labelling and the use of preservatives not permitted or in excess of what is permitted. The only one which is of any serious health consequence is watering milk. Of the 2869 samples of milk analysed in Birmingham, 239, or 8·3%, were below standard, all through the addition of water. We must not conclude from this that a twelfth of the milk sold in Birmingham is diluted, or that one dairyman in twelve is a rogue, for food samplers look out for milk open to suspicion. When we are told that there were eight serious cases of adulteration, all ending in fines varying from £7 to £35, we get a more just idea of the real extent of sophistication. The fines were the highest for several years, but they might well have been higher still, for watering milk is a crime which has grave consequences. Watering spirits will not perturb the health officer, and the substitution of margarine for butter, which is most common in "bread and butter" sold in cafés, is not likely to do much damage to the nutrition of the nation. Gone are the days when the manufacture of coffee beans from chicory, sawdust and plaster-of-paris was a lucrative industry, for good food is hardly less dear than its substitutes and food inspectors are sharp and their hand heavy. There is in fact no health service which has done its job better than the suppression of adulteration, but new methods of sophistication crop up occasionally and watch must be kept for acts of carelessness or stupidity.

It has always been puzzling why the control of the sale of drugs, so far as their genuineness is concerned, should be linked with that of foodstuffs, but even in the latest act of 1938 the two go together. The commonest drug offences are ammoniated tincture of quinine deficient in quinine, and sweet spirits of nitre lacking something or other. In Birmingham in 1939 there were 19 not genuine out of 471 drug samples analysed. Of these 3 were formalin tablets, 5 sulphur tablets, 3 fluid magnesia, 3 ammoniated tincture of quinine, and 1 each of bismuth lozenges, borax and honey, white precipitate ointment, Seidlitz powders and milk of sulphur. Not an imposing list.

INFECTIOUS DISEASE IN ENGLAND AND WALES

DURING THE WEEK ENDED SEPT. 14, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1384; whooping-cough, 1106; diphtheria, 1027; enteric fever, 93; measles (excluding rubella), 6179; pneumonia (primary or influenzal), 440; puerperal pyrexia, 116; cerebrospinal fever, 122; poliomyelitis, 47; polio-encephalitis, 6; encephalitis lethargica, 4; dysentery, 33; ophthalmia neonatorum, 91. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 13 was 1443, made up of: scarlet fever, 200; diphtheria, 195; measles, 305; whooping-cough, 24; enteritis, 41; chicken-pox, 37; erysipelas, 32; mumps, 4; poliomyelitis, 1; dysentery, 2; cerebrospinal fever, 23; puerperal sepsis, 25; enteric fevers, 29; other diseases (non-infectious), 60; not yet diagnosed, 66.

Deaths.—In 126 great towns, including London, there was no death from smallpox or from enteric fever, 2 (0) from scarlet fever, 7 (1) from whooping-cough, 14 (0) from measles, 41 (1) from diphtheria, 62 (3) from diarrhœa and enteritis under 2 years, and 9 (0) from influenza. The figures in parentheses are those for London itself.

Liverpool and Plymouth each reported 6 deaths from diphtheria. There were 5 deaths from measles at Liverpool. Liverpool and Hull each had 9 fatal cases of diarrhœa.

The number of stillbirths notified during the week was 207 (corresponding to a rate of 38 per thousand total births), including 20 in London.

Aequam memento rebus in arduis servare mentem has generally been thought to be pretty stiff advice; but the students of the Massachusetts State College at Amherst have gone one better.[1] On Sept. 21, 1938, a hurricane swept over Amherst, at the very hour when the freshmen were due to have the mental test commonly employed at that college to determine the level of their intelligence. An intrepid psychologist proceeded with the test in spite of falling trees, the "characteristic weirdness both of sound and vision which prevailed" and a lack of illumination due to failure of electricity (and no doubt partially remedied by hurricane lamps). The freshmen, not only intrepid but at the top of their form, turned in answers to the tests which were 20% better than the previous ten-year average of the freshmen classes tested. From this it might have been inferred that they were both calm and clever, but further tests were done, under more normal conditions, and they did no better than previous classes; their cleverness therefore was average rather than superior. Why then did they do so well in the storm, excelling themselves amid the welter of the elements? The explanation is ozone. Dr. C. A. Peters found that there were relatively large quantities of ozone in the air during the hurricane, and he says that "when all conceivable factors are considered it appears plausible that the unusual amount of ozone in the air during the hurricane served as a mental stimulant to the freshmen." If he is right we may yet see Wimshurst machines installed in legislative chambers and the translation of universities to the seaside.

1. *Science*, May 10, 1940, p. 450.

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In England Now

A Running Commentary by Peripatetic Correspondents

I HAVE been looking at the latest threepenny pamphlet of the National Institute of Industrial Psychology which tells of success in the rapid training of industrial workers. A skilled operative selected to act as teacher is first shown how to draw up a "book of words" crystallising the practical experience of that form of industry. He next studies the movements of the most efficient workers and records the easiest and best methods of delivering the goods. Armed with this "necessary knowledge" and this "standard procedure" he proceeds to train the body of workers. The pamphlet gives some astonishing examples of increased production as a result of this scheme which at first sight seems to cut across the whole doctrine of craft apprenticeship. But it is essential not to confuse the two issues—craftsmanship and repetitive production. Craft cannot be acquired by drill. It is a function of technical ability, artistry and skill. It takes years to acquire. No two craftsmen employ the same method to achieve similar results; the practice of surgery is convincing evidence of that. What the N.I.I.P. are concerned with is the vast mass of craftless people who are called on to produce in a hurry a complicated machine by means of team work in which each individual plays a prearranged and very limited rôle. For such as these drill is essential and drill can be effectively reinforced by motion-study and the development of the least complex and least fatiguing series of movements. To work like this for a time, such as in an urgent rearmament drive, is one thing—and a very good thing if planned wisely. To do it all one's life as part of an industrial system is another thing altogether. In the latter case there is not the emotional release that comes in war-time from fighting on the industrial front; satisfaction is then to be found in leisure and cultural pursuits. It is hardly the time to consider whether life can be divided into work and leisure as distinct from work as a part of life, or whether the mass-production industrial state is an object to be desired. Time and motion study—yes, certainly for war work—afterwards with wisdom it can be modified to allow mankind to produce efficiently and yet not lose its soul. For the time being, however, we must concentrate on winning the war and this *is* an effective method in skilled hands.

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At night I live in a cellar in the City. Sometimes I have a companion, but when I have none, though I am cosy enough when I get there, I loathe to return to it. So I go to my club instead for a late cup of tea and sit in comfort in a corner of the library reading, and always intending to start on my homeward journey of about a mile before the guns begin to fire; but I never do. This walk is not as dangerous as one might suppose. There are lulls in the firing that carry me a good way. Between the West End and the City are many shelters into which I could go, but don't. There are plenty of doors and entrances which are good cover if one heard an extra fearsome noise. This evening the walk has been unusual, because of the night; after the bright cold day with the nip in the air at sundown, the air was very clear. Starlight night above, the moon in its first quarter shone horizontally on the tops of the buildings leaving the depths in darkness, reminding me not of London, but the Middle East—Jerusalem, or the little town half-way up Mount Olympus in which I lived for a while. Above the buildings other rays from the searchlights shot up. Just as I had got opposite Bush House the guns burst out again furiously, adding big yellow momentary stars. I wanted to dodge under cover, but found on this side of the street no cover whatever. Great offices, their doors flush with their posts, rejected me; the older small ones, on the other side, had pillars to their entrances and doors recessed into their depths. And now that I wanted to take cover the Strand seemed very wide. The traffic was going faster, its sound had risen a note or two. I could never have imagined that, with shell bursting overhead, fast-moving traffic in the dark should have appeared as an impassable obstruction, but it did. To cross even Fleet Street with a lampstand in the middle was an adventure. In the end I was glad to reach my cellar, though I had enjoyed my walk and I believe the mild degree of fear to which I had been subjected had increased my enjoyment; I can feel that I am really in this war. Perhaps when a big bomb falls within a quarter of a mile of me I shall change my tune.

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I was under the arched doorway inserting my key in the lock of my cellar when a policeman went by. "Coo!" he said, "There's some more of it." "More of what?" I asked. "Shrapnel," said he; "it's tumbling about all over the place." I had heard none, but we are picking bits up all the time. Everyone is collecting them as souvenirs for their grandchildren. We have a plate-full; some have a meat-dish full. No doubt they can later be handed over for re-issue to the guns and I suppose really we oughtn't to be picking them up at all. But I would not advise anyone without a tin hat to remain in the street while firing is going on; and he who has a battle-hat and does not deign to wear it, he ought to have it taken away and given to another. I bought three for my household on the outbreak of the war and was laughed at; but anyone who had experience of last time should have done the same; and they don't laugh now. The only problem is to decide when going out whether to take another hat or not. If you do it becomes a nice point to choose when to change hats. When its raining, of course, the tin hat makes an excellent umbrella.

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Many air-raids had passed and brought havoc pretty close to our doors, and we had all wondered what it would be like when our turn came. Preparations for the evacuation of upstair wards by abnormal routes had been rehearsed. And then one dark night the crash came. It made the whole great building lurch. Those congregated in the reception-room at the end nearest the point of impact were propelled, most of them on all fours, towards the centre of the hall, but immediately did an about turn and ran towards the central stairway, only to find it demolished from top to bottom, together with the lift. The normal access to more than 50 patients and their nurses was completely cut off. The wards affected had had their doors blown in and were filled with the usual fine dust, like a grey smoke. A small fire on an upper landing was extinguished by agile students with water in tin hats. In quick time all the patients were brought to safety on the ground floor by the outside fire-escapes, some on stretchers, some in the arms of doctors and students. Everyone—nurses, students, members of the works department fire-squad, and above all the patients—behaved calmly and there was no panic or confusion. One frail little man with an empyema said to his rescuer, a member of the staff who had scarcely counted himself in the sere and yellow, "O, Sir, you shouldn't have done it, a man of your age. Supposing you had fallen down the iron stairs and hurt yourself—I should never have forgiven myself!" One resident was trapped on a top floor with a bad scalp wound and was rescued by the fire brigade. He is doing well. There were no other casualties. We were reminded of an old cup-tie slogan, "——'s patients never die; they simply fade away."

With reduced accommodation and staff the hospital is carrying on as a C.C.S. on the ground floor. All out-patient services and quite a good show of lectures and classes have been maintained. Research is not dead. On the day after the bombing two enthusiasts with ladders and rock-climbing tackle were seen rescuing their papers and damaged apparatus from their shattered laboratory on the third floor. Plans for a closer study of the problems of shock and blast injuries are maturing.

We are all greatly impressed by the courage and cheerfulness of our working-class friends. "We can take it" is the prevailing attitude. The conditions in which they spend their nights in the local deep shelters are grim and would shock a Skipper sardine. Many return to windowless and roofless houses to camp out by day. Their menfolk issued from their holes and hide-outs to help the hospital as soon as it was hit. One young woman whose labour started in a shelter went home, and when visited there by a member of the obstetric staff said, "I think I can have my baby here, Sir. I think I shall be all right." Her house had no unbroken windows and the end of the street was roped off for an unexploded time-bomb. Fortunately there was a bed in the hospital, where a quick-turnover maternity service is maintained.

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To wander at night round London—especially the East End—recalls the memory at every step to the night life in towns " back of the line " in France in the last war. Black, deserted streets, in which the flashes of gunfire reveal strange and unexpected obstructions. Suddenly one comes upon a knot of men in steel helmets, talking quietly in a doorway. As in Ypres or Albert, the local gossip is passed on—what has fallen, places to avoid, the advantages and disadvantages of the local shelters (we called them dug-outs then)—all just as it was 22 years ago. Up comes a warden with the news that " something has fallen in the next street. He " doesn't think it's gone orf, but it's hissing horribly." We go along to investigate, with the greatest reluctance in the case of at least one member of the party. On going into the street a loud swishing is certainly heard and we find ourselves ankle deep in water. The mystery is revealed as a burst water-main spouting as high as the roofs of the houses. We thankfully take leave of an impassioned argument as to whether or not it has in fact " gone orf," to investigate more shelters. Groping round for the doorway of a surface shelter, we eventually find it, like all the others, as empty and deserted as an abandoned battery position. Following directions designed to lead us to bigger game we find a street as apparently deserted as the others. Search reveals a chink of light under a door and suddenly inside is a brave new world—bright light, terrific heat and pullulating life.

On the way back, as we stop in a doorway for shelter from a patter of shrapnel or the flare which seems malignantly engaged in revealing *you*, Dr. ABC, to the " hovering " plane, up rattles the inevitable lost battery-wagon, now an auxiliary fire-engine. " Can you tell us where XYZ fire sub-station is ? We are from B "—a borough on the far side of London. We cannot, but a warden says he thinks it is about 12 turnings on the left, and everyone disperses into the night.

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The epidemiological problems of life in large shelters seem to be the reverse of those of the evacuation at the beginning of the war. Then it was feared that immune carriers from the towns, introduced into a non-immune population, might produce epidemics. None occurred, and the generally accepted explanation is that the herds into which the potential infection was introduced were too small and scattered for epidemic spread to occur. Now we are seeing persons who may have been living in comparative bacteriological isolation, such as infants, old persons or the complete families of small shopkeepers and respectable artisans, forcibly exposed to the bacteriological flora of large mixed herds. What will be the effects ? We are already seeing one result in what appears to be the prevalence of sore throats in shelters. Most of us are too busy to study these phenomena as they should be studied. In one shelter housing so many people that the final " O " is usually taken for a typist's error, the inhabitants range from coloured seamen to pretty girls in siren suits—from Hieronymus Bosch to Dali in fact. It would make a perfect test-tube for epidemiological observations. The situation is complicated by lack of ventilation. In the Underground there is at least some through-ventilation via the tunnels and stairways, and in the super-shelter referred to the atmosphere, though foul and cold, is not quite stagnant because the entrance cannot be closed. But some deep shelters I have visited seemed to be hermetically sealed and the air is so hot and of so low a humidity that the throat becomes dry very quickly. A fan or two would at least relieve the heat stagnation. Some scientific observations on the air in shelters about dawn would be of the greatest interest.

What has happened, by the way, to the bands and music which we were promised ? I was forcibly reminded of this when the all clear went in a big shelter. Where we lay it could not be heard but some sportsman sketched a reveille on a bugle and as the ragged notes cut the dank air you could almost see our morale improving and General Gloom with his attendant microbes Dirt, Stink and Hunger creeping away into a corner. Out we trailed to marches on a radiogramophone, with our tails well up.

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That north-west town that has been raided so often has not caught it anything like London, but part of it caught it pretty badly in a raid last week. I saw one building in a terrible state. I noticed vaguely that the walls were standing but it was the inside that was in such a mess. On one of the walls was a notice saying Business as Usual, so since it seemed to have been a public house I walked in. " A bitter, please," I said to the proprietor who came forward at once, " and I hope you will have one with me ; it is wonderful of you to keep open" He looked rather puzzled and said it wasn't quite time yet. I waited at the bar for midday to strike (it was a Sunday), and I noticed how tidily they had cleared up the debris. " It must be an awful worry to you," I said, and he agreed that it was a bit of a bother. He was still looking at me in a queer way, and when he served my drink he didn't seem at all keen on having one with me. " Are the brewers going to compensate you for your house being knocked about like this ? " I asked. " Whatever for," said he, " they didn't do it, I did it myself." This shook me a bit, but I tried to humour him. After all, the shock must have been enough to upset anybody. " When did it happen ? " I asked. " Last September," said the publican. This was too much and I told him pretty crossly not to tell me that there had been any bombing last September. He smiled. " The house hasn't had a bomb on it," he said, "I decided to rebuild it last year, and got it half done when the war held things up. We keep open so as not to lose our custom. Have a drink on me."

Parliament

ON Oct. 8 Mr. CHURCHILL gave the House of Commons another of his illuminating reviews of the war situation. He maintained his refusal to assume the rôle of a prophet; no-one, he said, could predict how this terrible struggle would run its course, how far it would spread, or how long it would last. Death and sorrow would inevitably be the companions of our journey ; hardship our garment ; constancy and valour our only shield. He could not hold out any immediate prospect of a complete and effective answer to night bombing, but he pointed out that all through the past month there has been a steady decline in the casualties and damage to so-called vulnerable points. Whereas when we entered the war we had expected to sustain losses which might amount to 3000 killed in a single night, and 12,000 wounded night after night, and hospital arrangements had been made on the basis of 250,000 casualties merely as a first provision, the actual experience of the air blitzkrieg had been much more favourable. Up to Sept. 29 about 8500 had been killed and 13,000 wounded as a result of air bombing. The figures of those killed and seriously wounded have declined from 6000 in the first week to just under 5000 in the second week and to under 3000 in the last of the four weeks. The House sent up a tremendous cheer when Mr. Churchill remarked that neither by material damage nor by slaughter would the people of the British Empire be turned from their solemn and inexorable purpose. He rejected the demand for bombing reprisals, except in so far as they were directed to the destruction of the sources of enemy war effort. Mindful of the large and growing problems of public health which are inevitably associated with the air war, and the displacement of large numbers of people from their normal methods of living, the Prime Minister gave a firm assurance that far-reaching measures were being taken not only to guard against the outbreak of epidemic disease but also to see that the stamina and morale of the people—especially in London and the great towns—were not undermined by the abnormal and primordial conditions. A widespread organisation of relief for those whose homes were smitten was, he said, already in being. Greater efforts were also being made to see that the provision of shelters was increased and made more effective.

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After Mr. Churchill's speech members in all quarters of the House made a praiseworthy effort to put their ideas into the common pool for the assistance of the Government. The debate, while indicating no desire to criticise merely for the sake of criticism, made it clear that irrespective of party allegiance members are keenly anxious that the sufferings of their constituents should not be added to by lack of coördination between the

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local authorities and the central government. Great stress was laid on the importance of measures for preventing disease in London and the large towns during the coming winter.

Mr. MALCOLM MACDONALD, Minister of Health, did his best to reassure the House on the principal points raised. He freely admitted that the plans made before the blitzkrieg had shown many faults as soon as the heavy bombing of London began. Two main mistakes had been made. First, too much had been left to the local authorities; and secondly, the circulars issued to those authorities had suggested too low a provision in the centres where people had to stay for considerably longer periods than the 48 hours or three days originally anticipated. But having made these admissions he protested against exaggerated statements which had been made by some of his critics. Hot meals were being provided at least once a day in the centres for the homeless. The process of getting people away from the food and rest centres and into houses was now going ahead. At the peak of the congestion in the food and rest centres there were 25,000 people there in the London region. That figure has now been reduced to 10,500. A large movement of rebilleting these people was going on every day.

Examining the problem of further evacuation from the vulnerable areas, particularly of mothers and children and old and infirm people, Mr. MacDonald pointed out that while accommodation still existed in the reception areas there was a limit to it, and the Government had desired to give priority to the classes who needed it most—mothers, and children of school age or under. The Government were considering the creation of hostels, particularly for young girls and boys who were over school age. The House could be assured that all the authorities concerned would not allow their energies to slacken until they had given the homeless people the proper care they deserved.

QUESTION TIME

Vegetarians and their Rations

In reply to a question Mr. R. BOOTHBY, parliamentary secretary to the Ministry of Food, said: The position of vegetarians has been carefully considered by the food rationing (special diets) advisory committee of the Medical Research Council. In the light of the restriction in fat rations which came into force in July last, the committee have advised that no extra fat rations are necessary, and in view of this authoritative opinion the Minister is not prepared to authorise the exchange of meat and bacon coupons for an extra allowance of margarine and/or butter.

Vitamin B_1 in White Flour

Mr. R. R. STOKES asked Mr. Boothby how soon synthetic vitamin B_1 would be inserted in all white flour; and whether he was satisfied that bread made from whole-wheat meal was now available in all districts at the same price as white bread.—Mr. BOOTHBY replied: It is hoped that vitamin B_1 will be available in sufficient quantities to fortify all white flour by next spring. Bread made from high-extraction whole-meal flour is available at the same price as white bread in most districts.

Canned Foods for the Army

Mr. G. MANDER asked the Secretary of State for War what steps had been taken to carry out the recommendations contained in the twelfth report from the Select Committee on National Expenditure with regard to the feeding of the Army, the greater use of canned foods to supplement the existing normal ration, and the appointment of a departmental committee of inquiry.—Mr. R. K. LAW, financial secretary to the War Office, replied: As regards the feeding of the Army, an experiment will be made of providing the ration for certain smaller statio units largely by tinned food. The Minister does not think that a committee of inquiry is necessary. But he has decided with the concurrence of the Chancellor of the Exchequer to invite two business men of experience to consult with the management of Navy, Army and Air Force institutes and advise whether and by what means the services which the institutes provide for the troops can be extended and improved.

Employment of Disabled A.R.P. Workers

Mr. H. J. PARKER asked the Home Secretary whether the provisions of the Disabled Men (Facilities of Employment) Act, 1919, would be extended to air-raid precautions workers who might be partially disabled by an accident and find it difficult to get work.—Mr. HERBERT MORRISON replied: If it should be found that such men are hindered from getting work because their employment increases the industrial accident risk, the question how to prevent them being placed at a disadvantage on this account would certainly have to be considered, but experience of the operation of the Act of 1919 showed that there is little, if any, ground for the fear that the employment of disabled men may increase the accident risk.

Central Medical War Committee

Mr. T. E. GROVES asked the Minister of Health what authority the officers of his department attached to the Central Medical War Committee as observers had; how many of such observers attended each meeting of the committee; and what action was taken if the advice of these observers was not adopted by the committee.—Mr. M. MACDONALD replied: The officers in question have authority to assist the committee with their advice and generally to keep in touch with the proceedings on my behalf. Normally two such observers attend each meeting. If the situation indicated in the last part of the question were to arise, the action taken would depend upon the nature of the issue involved.

Obituary

MAUDE ELIZABETH SEYMOUR ABBOTT

B.A., M.D., F.R.C.P. CANADA, L.R.C.P.E.

Dr. Maude Abbott died in the Neurological Institute of Montreal on Sept. 2. She was in her 72nd year and had been ill for about two months. Dr. Abbott held a unique position in Canadian and world medicine. A pioneer medical woman, she was a student of Bishop's College, Lennoxville, where she obtained her M.D. degree in 1894. In 1890 she had taken the B.A. degree of McGill, winning the Lord Stanley gold medal for general proficiency, but in those days women were not admitted to the medical faculty of that university, of which later she was to become a distinguished member and from which in 1936 she was to receive the honorary degree of doctor of laws. After qualification, Dr. Abbott continued her studies in Zürich, Vienna and Edinburgh, where she took in her stride the Scottish conjoint diploma. In 1898 she was appointed assistant curator of the medical museum of McGill University and curator two years later. From 1905 until 1912 she held the post of research fellow in pathology at McGill, and was then appointed lecturer in pathology. In 1923 she was granted two years' leave of absence from McGill to reorganise the work of the departments of pathology and bacteriology in the Women's Medical College of Pennsylvania, and to correlate clinical and pathological teaching and the development of medical research there. Dr. Abbott retired from her official duties at McGill in 1936, but continued with her research. Among pathologists she was perhaps best known as secretary-general and moving spirit of the International Association of Medical Museums. Her enthusiasm for the medical museum was immense; her influence was widely felt, in Europe as well as in America.

Dr. Abbott's other abiding interest in medicine was the study of congenital heart disease. She contributed this section to Osler's Modern Medicine and to Nelson's Loose-Leaf Medicine, and in 1936 she published her own Atlas of Congenital Cardiac Disease, with the promise of a larger manual to follow. An intimate friend and admirer of Osler, she had lately completed a comprehensive bibliography of his works.

Dr. Abbott came of a family which holds an honoured place in Canadian public life. She was proud of her English stock—her forebears belonged to Little Strickland in Cumberland—and she had many close friends in this country. Kindhearted and generous to a fault, she combined a quiet simplicity of mind with great intellectual ability and an energy and enthusiasm which were at once the admiration and despair of her friends. In her long and happy life she had passed through much tribulation—she had had "misfortunes great and sma', but aye a heart abune them a'"—and the memory of her joyous, vital, enthusiastic personality will ever be treasured by those of us who were privileged to be her friends.

M. J. S.

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Letters to the Editor

A CHRISTMAS APPEAL

SIR,—The war has brought many changes into our lives, but as winter approaches may I remind your readers, who have so generously responded to my Christmas appeal for many years, not to forget or overlook the gifts which the Royal Medical Benevolent Fund endeavours to distribute to all its beneficiaries. These old people have had their share of hardships. For the most part they live alone in lodgings or in bed-sitting-rooms. Some have had to move out of their rooms by the coast; those in London and other towns have had anxious days and nights. I ask your readers to remember these medical colleagues, their widows and families, and to help us to send to each a gift of thirty shillings this Christmas as a token of our sympathy. The extra money brings comfort and warmth into many lonely sad lives and the feeling of "not being forgotten."

Donations should be sent to the new address of the Royal Medical Benevolent Fund, 1, Balliol House, Manorfields, London, S.W.15, and cheques made payable to "R.M.B.F. Christmas Gifts Fund." Please forward donations now to enable the gifts to be distributed before Christmas Day.

THOS. BARLOW,
President, R.M.B.F.

NEUROTICS IN THE FORCES

SIR,—Will you allow me to disagree vigorously with Dr. Kerr's pathology of neurosis and his physical-jerks psychotherapy? Does he really contend that the precursors of neurosis—which in any case is not an entity—are muscular imbalance, general untidiness, poor posture, &c., or that accuracy in sensation and in action create mental confidence? Mental confidence in what—an examination, an air-raid, tight-rope walking, or the particular exercise in which this skill has been acquired? Even in the latter great precision in performing a specific task may not give confidence, at least in anticipation. The famous Victor Trumper was reputed to be like a cat on hot bricks in the pavilion. Mademoiselle Lenglen, whose muscular balance and accuracy of action were phenomenal, was of a most unstable temperament, while G. C. Macartney ruined a season, according to the papers, owing to "nervous breakdown." And I can assure Dr. Kerr that a lifelong devotion to cricket has not inured me to the screech of a diving aeroplane; while, to take up the cudgels for the really untidy, if untidiness is a precursor of instability, the mental hospital is very near for me.

Surely all the evidence points to the facts that these physical traits are concomitants (not precursors) not of neurosis in general but of a certain type of highly strung individual, the type Winnicott describes as "nervy." Actually some of the worst anxiety states I have seen have been in heavy-weight boxers and policemen. If the predisposition to neurosis can be cured by such methods, why was I told by an orthopædic surgeon of repute that he liked to refer cases of poor posture to psychiatrists because so often they were secondary to psychological states? Or is the nervous child to be cured with the Victorian backboard between its shoulders? I have written with some heat about this, because Dr. Kerr has put forward the type of easy explanation which is so readily accepted by those who don't like psychogenesis, and I think it should be made clear that many would disagree. But there are more urgent general problems regarding current war neuroses which concern psychiatrists. I should, for instance, like to learn the experience of others whether it is ultimately undesirable for war neuroses to be treated somewhere which is absolutely safe, on the grounds that it is next to impossible to get them back to dangerous work afterwards. My experience is derived from a hospital which is reasonably safe, although practically every German aeroplane to London flies over it. I find that in cases of anxiety following exposure to bombing the fact that from the very start the patients are subject to incessant alarms, dronings, and not too distant bangs has a bad effect. It never really gives them a chance to settle down.

Another matter is raised in your excellent leading article on casualties in London, in which you urge that provision should be made "to give patients the sense of security for which they crave." Might one not add—to which they are entitled? This question of shelter is extremely important. The "anxiety states" of war are really "fear states"; a 500-lb. bomb seems to be entitled to be called a pretty good reality situation. Prophylaxis therefore consists in doing all that is possible to give security, which for many means being underground. Apart from the physical pros and cons, it seems to me that if a *feeling* of security can be attained this in itself is of considerable importance. Recently two of my "anxious" patients begged to be discharged home to Dover! Their reason was that at least there was some kind of shelter there, yet I hope we are far safer here. More important in prophylaxis than the avoidance of the valgus position of the feet is the promotion of security and sleep by the provision of better 'oles for the population to go to.

Kent. W. LINDESAY NEUSTATTER.

TREATMENT OF WAR NEUROSES

SIR,—Recent correspondence illustrates the present tendency in medical circles to look upon the psychologist with suspicion and mistrust. The present war appears to have been seized upon as an opportunity to regress to the year 1917 and again to discourage this form of therapy. Memories are short in such matters. The more materially minded of the medical profession still resent illnesses of emotional origin, as is shown by the tendency to laugh at or bully such unfortunate sufferers. They forget the need for such treatment that arose after the last war and will arise after the present conflagration is over. The good work done by psychologists of the Ministry of Pensions from 1919 onwards seems either forgotten or denied. The West End Hospital for Nervous Diseases has long recognised the necessity for a department that could handle in civil life the need of the psychogenically afflicted. In the beginning each physician on the staff had a psychotherapist attached, to whom he passed such cases as needed this special treatment. It was found so successful that later a special psychotherapeutic department was set up and is still in existence.

One would have thought that such a national calamity as war, with the tendency it must bring with it to neuroses, civil and military, would have called for the further help of accredited psychologists, but the opposite appears to be the case. The Germans have harnessed mass psychology to their war machine with considerable success. If they can appreciate its importance to the masses as a means of destruction, we should not fail to recognise its power as a constructional factor for the individual. Under strain each man has his breaking point and it would be a pity that a legacy, from the war, should be left of a number of the population broken in spirit and unfit adequately to discharge their obligations as citizens, especially when they could by proper treatment become re-adjusted to life.

London. A. C. WILSON.

PSYCHIATRIC COMPLICATIONS OF HYPOGLYCÆMIA

SIR,—In your issue of Oct. 5 Dr. Wauchope states that she knows of only one case in which profound mental changes followed hypoglycæmia. If she will refer to the work of N. Malamud and L. C. Grosh (*Arch. intern. Med.* 1938, **61**, 579), A. B. Baker and N. H. Lufkin (*Arch. Path.* 1937, **23**, 190), Baker (*Ibid*, 1938, **26**, 765), and G. de Morsier and J. J. Mozer (*Ann. Méd.* 1936, **39**, 474), and other Continental and American writers quoted in my report, she will find that the occurrence of cerebral damage following hypoglycæmia is now well established by clinical and experimental evidence. On the physical side the response to glucose and the normal cerebrospinal fluid in the first case do not support a diagnosis of encephalitis; while psychiatric examination showed a generalised dementia with blurred focal signs representing a sharp and considerable deterioration from his former level. The second case was reported as a hypoglycæmic behaviour disorder and not as illustrating permanent mental damage, although this is probable. There was no evidence that either child was congenitally mentally defective.

Barrow Gurney. E. W. ANDERSON.

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COMBATING SLEEPLESSNESS

SIR,—Dr. Harris advocates the use of bromides in large doses as an antidote to air-raid insomnia. He states that most people can take gr. 30 of sodium bromide three times a day "quite easily." Admittedly the consumption of this quantity is not difficult, but unfortunately the use of a draught of cold water, recommended to "wash away the taste," will not have a comparable effect on the risk of subsequent bromism. It should be more generally known that bromides are excreted slowly and that a toxic psychosis may develop within two weeks of the patient taking as small amounts gr. 45 to gr. 60 a day. Elderly or arteriosclerotic people are especially prone to develop symptoms that will persist for weeks. Weakness, inability to concentrate and broken sleep occur frequently, so that there is a very real risk of the condition being missed and the amount of bromide increased in the vain attempt to counteract its own ill-effects. Sleeplessness during air-raids is mostly due to anxiety, which can best be countered by promoting as far as possible a sense of security. Drugs and more particularly a combination of them have their place, but unless they are used with more circumspection than Dr. Harris suggests we shall have a fresh group of casualties, produced by the inconsequential therapy of our own profession.

Bristol, 8. T. M. LING.

CLASSIFICATION AND EVACUATION POINTS

SIR,—I am in charge of a first-aid post in a district which has suffered rather badly, and I can confirm from experience what you say in your leading article of Oct. 5 about the great advantage of having the post situated underground. The patients I have seen at the post appear to be quite happy while there, in spite of bombs dropping in close proximity to our building. But several of them were very frightened at the idea of having to go for further treatment to one of our local hospitals. Two of these had been put out of action by aerial attack, and it is easy to appreciate the feelings of a person who, having been lucky enough to survive one bombardment, is sent to bed in a place which he does not believe perfectly safe.

As you say, it is wise to prepare for the battle of London to last for some time and increase in severity, and casualty clearing points after the style suggested by Dr. Shirlaw in his book would be very helpful. It should not be difficult to find places for them. As an example, the first-aid post in which I work appears to me ideal. It is close to the railways, and has good wide roads approaching it, so that ambulances can reach it direct, and they can be unloaded beneath a roof. It is underground, and is protected above by a large steel-framed building with several floors of reinforced concrete. The post is a considerable distance from any hospital, and has accommodation for several hundred patients. The heating, lighting and water arrangements present no great difficulty. We have a constant supply of hot water and electricity, and the post could be effectively heated at a minimum cost.

I can see the great advantage of a place such as this being used as a casualty clearing point. At the moment we are only using a small portion of the space available as our first-aid post and I often feel sorry that we cannot keep some of our patients for further treatment rather than transfer them to a hospital which does not present the same degree of safety, and from which they will be evacuated to the country a week or so later.

There is need for immediate action in this matter, rather than waiting until more of our hospitals are either disorganised or rendered completely useless.

MAX SAYERS.

SHELTER PALSY

SIR,—During the past few weeks I have observed five cases of sleep palsy of the musculo-spiral nerve. In all of these paralysis was first noticed after sleeping on the concrete floor of air-raid shelters. One hopes that with the provision of bunks in shelters these cases of "shelter palsy" will soon become things of the past.

Harley Street, W.1. SIMON BEHRMAN.

MORPHIA IN BLAST CONTUSION OF THE LUNG

SIR,—Your annotation of Oct. 5 (p. 426) suggests the cautious use of ¼ grain doses of morphia in blast injury to the lung. It is not a sound principle of therapy to deny the full use of a unique and advantageous drug unless its incidental deleterious effects cannot be avoided or controlled. This, I submit, does not apply to morphia in the case cited. The proper use of oxygen, carbon dioxide and other respiratory stimulants should counter both the peripheral and central respiratory depression of morphia. Full doses of this drug—by all means the heroic half grain dose—should be used as the patient's general condition indicates, and where controlled oxygen and carbon-dioxide administration is available, as with the B.L.B. inhalation apparatus described in the M.R.C. war memorandum on wound shock. When the general rest of morphia is no longer necessary it may be desirable to consider the use of local methods of resting the injured lung. If a pneumothorax is to be induced, it is as well to remember that the Scylla of infarcted lung and pneumonia and the Charybdis of continued hæmorrhage, which Riviere envisaged in the use of morphia in hæmoptysis, may also have to be negotiated here.

London, S.E.12. C. W. M. WHITTY.

VISCERAL PAIN

SIR,—In your issue of Sept. 28 Dr. Bentley and Dr. Smithwick state that Kellgren and myself in our paper in *Clinical Science* (1939, **4**, 47) have denied pain sensitivity to the bowel. We discussed this question briefly from a historical standpoint, and after considering the evidence at our disposal said that "it is difficult therefore not to accept Lennander's conclusions." This is a much more diffident summing up than the pronouncement ascribed to us. They also say that we suggest that bowel pain arises from traction on the sensitive mesentery. This again does not properly represent us; we did not make the suggestion but pointed out that Lennander had. I would not discuss the two points of disagreement with sentences of a paper whose original observations I appreciate whose general tenor I am in substantial agreement were it not that I have yet to express my own views fully on these matters, and am unwilling to seem committed to the complete exclusion of the bowel as a direct source of pain. I feel sure that on re-reading our text Dr. Bentley and Dr. Smithwick will recognise that they have unwittingly carried our views farther than our text intended.

London. THOMAS LEWIS.

STONE-MILLED FLOUR

SIR,—We seem to have reached a climax of folly in eliminating a natural essential vitamin from our flour only to find ourselves under the necessity of replacing it artificially. When I was a boy, and for centuries before, the farmers sent their wheat to the local mills which abounded on the River Kennet. The wheat was ground and the resulting flour was supplied to the local bakers and to private households. The offals went back to the farmers. There were two kinds of flour, one called "wholemeal," the other "white flour," a very different article to the white flour provided by the steel mills of today. For many years now the old mills have been gradually driven out of business by the big steel-roller millers. During this time there has been a steady increase in various illnesses in this district, notably those of a catarrhal nature, a deterioration of the general health, and, I am inclined to believe, a marked decline in fertility. In my early days, fifty years ago, meat was a luxury enjoyed by the few. The agricultural labourers never had it more than once a week and probably not so often. But they had the local bread and they also had milk for their families. Those of today, in spite of what is described as a higher standard of living—which might in many respects be interpreted as more expensive—do not seem to have the stamina of fifty years ago, though I admit there has been improvement in general physique from that of 1914. I have no doubt in my own mind that a main cause of the increase in catarrhal disease is the deterioration in the quality of the flour.

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It was stated in the House of Commons that it was impossible to organise a change of milling processes in war-time. I believe that with little effort many of the old mills could be set working again and a vast economy effected. There would also be the advantage of a lessened concentration of vast stocks in one area and a consequent lessened chance of big losses by air-raids.

It has also been stated that people demand the white flour as produced from steel roller mills. I do not believe they would if they had the chance of eating bread made from the "white flour" of the stone mills, and probably a large number would even prefer the wholemeal flour. I use home baked, stone-milled flour bread in my house and it is regarded as a great treat by all, of whatever class, who taste it. Another argument against the use of a larger portion of the wheat for bread was that it would reduce the value of the offals. I think the farmers would be glad to have the chance to get the offals of the stone-milled flour locally, rather than see the bulk of them exported to the continent direct from the steel mills, as was happening till the war prevented it.

Marlborough, Wilts. W. B. MAURICE.

M.R.C. MEMO ON GAS GANGRENE

SIR,—As one who had some part in drawing up the scheme for the bacteriological investigation of wounds on behalf of the War Wounds Committee, might I point out that in your leading article of Oct. 5 you have not quite grasped its real purpose? The scheme suggested was not intended for fully equipped laboratories but for smaller laboratories—field laboratories and certain hospital ones—where there is a lack of complete facilities for carrying out the finer bacteriological examinations such as toxin estimations and pathogenicity tests. In any case the identification of anaerobes by toxin production, particularly *Clostridium welchii*, is still in the experimental stage, and at the present moment identification is best carried out by fermentation reactions and cultural appearances. Lastly, the objection to screw-caps was surgical.

Stoke Mandeville, Bucks. JAMES MCINTOSH.

STATE MEDICAL SERVICE

SIR,—During the war we have been witnessing the functioning of what one of your contemporaries calls "a state medical service administered by the Ministry of Health in association with the local health authorities," to wit, the Emergency Medical Service. An unbiased examination of its activities during the past twelve months should be of assistance to us in the contemplation of a similar service permanent under peace (or even war-time) conditions. At the beginning we were informed that the blundering and short-sighted methods of the past were to be replaced by a more modern and more efficient administration, and despite these innuendoes the profession fell into line. But let us for our future information contemplate the harvest: alterations and adjustments and again further alterations and adjustments in the pay and conditions of service of E.M.S. officers, resentment and recrimination over recruiting and other medical boards, indecisions and uncertainty over pensions to E.M.S. officers or their dependants in case of injury or death during execution of their duties. Still, as a surgeon to two hospitals, one of 100-plus beds and another of 200, I was not unduly dissatisfied with my lot until I discovered that according to the Ministry of Health my real designation was that of "an inhabitant of a county-council area," of which the county M.O.H. is in control as group officer, charged with organisation and administration. In this area, which is a defence area on the south coast containing a considerable number of troops, the position after twelve months of war—during which like other people we have had our bombs and casualties both fatal and otherwise—is as follows:—

(1) The only general hospital has been "enlarged" by placing extra beds in the wards, amounting roughly to one extra bed for each 1000 members of the contributory scheme.

(2) A new E.M.S. hospital of over 100 beds has been created on the edge of the cliffs amongst the barbed-wire entanglements of the front-line troops which would have to be evacuated in the event of an attempted invasion, but the Ministry of Health continues to enlarge and expand it.

(3) A hospital of over 100 beds with a class-I E.M.S. officer resident there (salary £550 per annum), and an excellent nursing staff, is equipped with the sterilising apparatus borrowed from a neighbouring cottage hospital of 11 beds, and the metal rationing now prevents the purchase of new sterilisers.

(4) The county-council hospital has been considerably enlarged, but there is no theatre and the medical staff consists of one visiting general practitioner and sterilising equipment for 12 maternity beds.

The object of this letter is not to bore with our local conditions those who are I hope more happily situated, but to provide illustrations of the results of what a genius for disorganisation can achieve. May I advise the younger members of the profession in particular to think again before they surrender their careers and future too freely to "a state medical service administered by the Ministry of Health in association with the local health authorities." For them at any rate I am afraid such a step will become inevitable. Let them see to it that when this crisis comes they take steps to provide such adequate safeguards as a united front alone will ensure.

1914 STAR, F.R.C.S.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

UNIVERSITY EDUCATION

SPEAKING of the British universities at a meeting of the Royal Philosophical Society of Glasgow Sir Hector Hetherington, principal of Glasgow University, said that about one in every 1000 of the population of Britain was a university student. In Scotland the proportion was nearly one in 500, in Wales one in 750, and in England one in 1080. There were some striking differences in the resources of the universities. The income of Oxford and Cambridge was much in excess of any others. London University had an annual revenue of nearly £2,000,000, the civic universities of England about the same, the four Scottish universities £880,000 and Wales just under £400,000. Measured against the load of their teaching work the income of the Scottish universities was on a far lower level than that of any other group. The universities accepted the function of organised research as well as teaching and a substantial part of their revenue and energies were devoted to that purpose. Large-scale material equipment was often called for since scientific research was largely a matter of coöperative team work. The range of the service of the universities had steadily expanded over the last 100 years and demands would continue to increase as national life became more complex and called for higher levels of competence in every branch of professional activity. There were difficult material problems ahead but the most difficult and crucial problem was not material but spiritual or educational—the problem of providing, through the rarified disciplines of highly specialised modern curricula, an experience which enriched and unified the mind.

CHEAP MILK IN FIFE

Dr. G. Matthew Fyfe, county medical officer of Fife, has expressed the suspicion that milk supplied under the national milk scheme is finding its way to a disproportionate number of people in a position to purchase milk without assistance from public funds. He reported that during the three months to Sept. 30, 4949 applications for cheap milk and 1919 for free milk had been received. It had been estimated when the scheme was first mooted that there were about 20,500 expectant mothers and children under five years of age in the county and that probably two-thirds would apply. The number of applicants was increasing daily. Many applications had been received from teachers, policemen, salaried officials, and professional and business people. They were perfectly entitled to apply but the scheme had been mainly aimed at benefiting working-class people who were not in a position to purchase all the milk their children required. The scheme had not been in operation long enough for a critical review to be made of its merits, but Dr. Fyfe felt there was justification for the doubt whether its benefits justified the financial outlay. The scheme in its present form was unwieldy. It was startling to realise that when one pint of milk was issued eight forms had to be filled in, some of them in duplicate. The

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amount of clerical work was assuming formidable proportions, so much so that some dairymen had indicated their intention of ceasing to participate in the scheme.

MICROSCOPES WANTED

The Department of Health for Scotland has made an urgent appeal to doctors, scientific workers and others who can spare their microscopes to lend them for use in the hospitals of the Emergency Medical Service. The hospitals need microscopes with the ordinary low and high power objectives without mechanical stages as well as instruments equipped with oil-immersion objectives and mechanical stages. Sub-stage condensers are desirable. Instruments which are lent will be returned in good condition at the end of the war. Those which are offered for sale should be fully described and the price indicated.

Appointments

ALMOND, SIMON, M.D. Manc., M.R.C.P.: hon. asst. physician to the Salford Royal Hospital.
COLLINGWOOD, F. C., M.B. Brist.: M.O. at Gambia.
DAY, MARY T., M.B. Lond.: temp. asst. M.O. (maternity and child welfare) for Northampton.
DAVIES, H. L., M.Ch. Lpool: surgical registrar at the Royal Liverpool Children's Hospital.
DEBOVITCH, LOUIS, M.B. Sheff.: resident orthopædic officer at Grimsby and District Hospital.
FIDDICK, T. L., L.D.S. Eng.: temp. asst. dental surgeon for Exeter.
HAY, JANNETT C., M.D. Lpool: medical registrar at the Royal Liverpool Children's Hospital.
LANE, R. E., M.B. Lond., F.R.C.P.: hon. physician to the Salford Royal Hospital.
THOMSON, M. L., M.D. Aberd., M.R.C.P.: hon. asst. physician to the Salford Royal Hospital.
WINTER, HARRY, M.D. Toronto: R.S.O. at the Coventry and Warwickshire Hospital.
WINNING, JOHN, L.R.C.P.E.: Asst. M.O. for Glasgow.

Births, Marriages and Deaths

BIRTHS

CROSS.—On Oct. 11, at Petersfield, the wife of Mr. Alexander G. Cross, F.R.C.S.—a daughter.
DEAN.—On Oct. 6, at Newton Abbot, the wife of Surgeon Lieut.-Commander D. M. Dean, R.N.V.R., of King's Lynn—a daughter.
GOADBY.—On Oct. 8, at Woking, the wife of Dr. H. K. Goadby—a daughter.
GUNNERY.—On Oct. 9, at Maidstone, the wife of Surgeon Lieutenant Oswald Gunnery, R.N.V.R.—a son.
HAMILTON.—On Oct. 8, at Blundellsands, Lancs, the wife of Mr. C. John K. Hamilton, F.R.C.S.—a daughter.
PORTER.—On Oct. 8, at Northampton, the wife of Dr. Hugh Lachlan Porter, of Woodbridge—a son.

MARRIAGES

BRIGGS—THURSTON.—On Oct. 5, at Ruislip, Geoffrey O. A. Briggs, M.B., elder son of Dr. J. A. Oswald Briggs, of Nottingham, to Betty Maisie Thurston.
DAVIES—ERNEST.—On Oct. 5, at Cambridge, David Vaughan Davies, M.B., to Ruby Bertha Ernest.
TURQUET—HUNTER.—On Oct. 12, at Farnham, Pierre Turquet, M.R.C.S., Lieutenant, R.A.M.C., to Ellen Clare Hunter.

DEATHS

FRANCIS.—On Oct. 13, at Hastings, Alfred George Francis, O.B.E., M.B. Lond., F.R.C.S., F.S.A., aged 77.
HEAD.—On Oct. 8, at Reading, Sir Henry Head, M.D. Camb., F.R.C.P., F.R.S., aged 79.
ROBINSON.—On Oct. 9, at Stanhope, co. Durham, William Robinson, M.D., D.Ch. Durh., F.R.C.S., J.P., aged 80.
STRATHY.—On Oct. 12, at Birmingham, Frederic Rolph Lee Strathy, M.D. Toronto, M.R.C.P.E., aged 91.
WEBB.—On Oct. 7, at Hadley, Cheadle, Cheshire, Frank Webb, M.R.C.S., D.P.H.

THE use of iron sulphate has been suggested (*Lancet*, Sept. 14, p. 340) as a substitute for other iron salts which do not justify importation or manufacture in war-time. There is some doubt (*Ibid*, Sept. 21, p. 366) whether ferric salts are absorbed as such. Mr. H. W. Tomski, M.P.S., chemist to Damancy & Co. Ltd., writes about a prevalent belief that ferrous sulphate cannot be given in watery solution because of its instability, and mentions the following formula which he has published (*Pharmaceut. J.* 1939, **1**, 239) for a stable liquid preparation:

Ferrous sulphate	2·500	Essence of pineapple	0·125
Copper sulphate	0·006	Oil of lemon	0·025
Dilute sulphuric acid	2·000	Acid fuchsine	0·006
Citric acid	0·200	Yellow dye (for acid)	0·050
Lime juice	6·000	Chloroform water	to 100·000
Dextrose	20·000		

An elixir has since been put on the market containing gr. 3 of ferrous sulphate (approx. 39 mg. of metallic iron) to the ounce.

Medical News

University of Cambridge

The titles of the degrees of M.B. and B.Chir. have been conferred on M. K. Cole of Newnham College.

University of Sheffield

Dr. F. T. Thorpe has been appointed temporary lecturer in mental diseases.

University of Manchester

Dr. T. E. Barlow and Dr. Sidney Mottershead have been appointed assistant lecturers in anatomy in the university.

University of Wales

At a recent examination for the diploma in public health Phyllis E. M. Bowen and Nancy G. Rogers satisfied the examiners in part I.

Royal College of Surgeons of England

A quarterly meeting of the council was held on Oct. 10, with Mr. Hugh Lett, the president, in the chair. Mr. H. A. Lane was admitted as a Macloghlin scholar and Mr. G. R Davies was nominated as the 48th Jenks scholar. A diploma of fellowship was granted to W. S. Lewin (Univ. Coll.). The posts of chief surgical officer, senior fellow in surgery, fellows in surgery, and resident surgical officers at the Prince Henry Hospital, Sydney, were recognised for the six months' surgical practice required of candidates for the final examination for the fellowship.

Diplomas of membership were granted to the following:—

S. M. Ali, J. F. Bourdillon, D. F. Cocks, R. V. Dent, G. B. Locks, J. N. Malins, Mangadu Rathnavelu, Peter Smith, N. C. B. Trapps, and P. D. Trevor-Roper.

A licence in dental surgery was granted to R. A. Zorab.

Diplomas in child health were granted, jointly with the Royal College of Physicians, to the following:—

A. J. W. Beard, Jack Fiddes, A. N. Ganguli, M. J. Parsonage, Cicely Steer, and John Thomson.

The Thomas Vicary lecture which was to have been delivered by Dr. Arnold Chaplin on Nov. 14 has been postponed. The museum is closed but the library will remain open.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Oct. 7, with Mr. Roy Young, the visitor, in the chair, the following were admitted to the fellowship:—

G. J. Aitken (Bellshill), J. D. Arthur (Slamannan), George Bankoff (London), Alexander Brown (East Kilbride), William Clement (Glasgow), David Douglas (Glasgow), D. C. Miln (Glasgow), D. H. Wallace (Renfrew).

British Homœopathic Association

The annual meeting of this society will be held at the London Homœopathic Hospital, Great Ormond Street, London, W.C.1, on Wednesday, Oct. 23, at 2.30 P.M.

West Indian Welfare Fund

Sir Rupert Briercliffe, formerly director of medical services in Nigeria, has been appointed medical adviser to this fund.

X-ray Therapy Equipment

At the State Institute for the Study of Malignant Diseases in Buffalo, New York, a million-volt X-ray therapy unit has been placed in a new three-story wing which will provide beds for 78 patients and accommodation for the director, the staff, and the administrative offices. There are also examination and treatment rooms attached to the X-ray and radium department.

Million-volt units are also installed in Memorial Hospital, New York City, and St. John's Hospital, Cleveland, Ohio. Speaking of the new unit Dr. Edward Godfrey, Jr., state commissioner of health said: "Unlike the less powerful X-ray therapy equipment of only a few years ago which required housing in a separate building, this new high-voltage machine occupies a single room. With its half ton of protective lead the entire unit weighs only about 4,000 pounds. . . . The institute's radiation equipment includes a 140,000-volt unit for intermediate therapy, one 400,000-volt outfit, three 220,000-volt machines for deep X-ray therapy and 8 g. of radium."

PHARMACEUTICAL SPECIALITIES (May & Baker) Ltd., Dagenham, announce a reduction in the price of their product Dagenan (M. & B. 693).

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Notes, Comments and Abstracts

PHYSICAL THERAPY IN ARTHRITIS

PHYSICAL therapy is perhaps the most important single method in the armamentarium of the physician called upon to treat arthritis and rheumatism in its various forms. Once a diagnosis has been made a programme of treatment must be mapped out which should include, in addition to physical therapy, elimination of foci of infection and correction of repeated joint trauma or strain associated with occupation, sport, obesity, flat-foot or scoliosis. The diet must also be adjusted, and drug and vaccine treatment, psychotherapy and environmental conditions considered. Three groups of physical measures should be taken into account: those producing heat; massage, manipulation and splinting; rest, exercise (muscle re-education) and postural re-education. Krusen [1] has recently pointed out that it is not necessary to transfer a patient to an institution in order to apply this type of treatment. Simple measures and apparatus can be devised in his own home at small cost; these include the application of hot paraffin wax to swollen joints, contrast baths, simple massage as an adjunct to more skilled treatment, manipulation and the prevention of deformity by means of simple splints and postural exercises. He considers that the general practitioner can be responsible for preventing the occurrence of arthritic deformities, especially adducted shoulders, kyphosis and fixation of the thorax, flexion of the elbows, wrists and knees, adduction of the hips, and foot-drop.

Hench has pointed out [2] that even when a patient has benefited by prolonged physical treatment in an institution the improvement may be lost on his return home unless treatment can be continued there. The average patient with arthritis or chronic rheumatism is unable to stay in hospital indefinitely, for financial reasons, and must be given a substitute at home for the more elaborate physical therapy of hospital. W. S. C. Copeman [3] discussing the treatment of rheumatism in the army has described simple methods for use where electric power is not available. Rest, both general and local, is essential for an arthritic patient during the acute inflammatory stage, but the pain alone is not a reliable indication of inflammation, and if accepted as such may serve to perpetuate the period of rest, and so favour the formation of adhesions. Once these have formed the only hope lies in manipulation, which used simply, need not be the monopoly of the orthopædic surgeon. Medical orthopædics, to use Mennell's term, includes the consideration of simple joint supports, the correction of shoes for minor degrees of flat-foot, and postural training to avoid abnormal strains on the joints. Our responsibility towards the rheumatic or arthritic patient does not end when he is sufficiently recovered to leave his bed, and the logical continuation of physical medicine is to be found in occupational therapy. This phase in the rehabilitation of the rheumatic patient is still in its infancy and will no doubt receive further study in association with the movement for a national rehabilitation board recently advocated in the columns of the *Times*. Many simple devices and occupations can be adopted in the home to strengthen the wasted muscles and increase the movement of stiff joints. The appointment of Sir Robert Stanton Woods as consultant in physical medicine to the Army is likely to lead to advances in this field.

A HOSPITAL STRETCHES ITSELF

WHEREVER we look today we notice economies, retrenchments, and services cut down, sometimes with anything but good effect. Hospitals, at least, should be risking a wise extravagance at a time like this, and it is pleasant to know that St. James's Hospital at Leeds has just opened new extensions. The aim has not been to increase the number of beds, which remain at the old figure of 1300, but to improve diagnostic and remedial services, and to give better accommodation to the nursing staff. The newly built nurses' home will take 369 nurses and 39 other staff; it contains a spacious common room, floored like a ball-room with maple, a comfortable library, and nurses' quarters in which each room is supplied with a built-in wardrobe and dressing-table, a divan bed, easy chair, lavatory basin, radiator and heated towel-rail. It is long-sighted policy on the part of any hospital committee to make its nurses comfortable.

Another new block contains the operating-theatre suite, X-ray, massage and electrotherapeutic departments and the nurses' training school, with lecture- and class-rooms, a model ward and a cookery room. The two new theatres on the ground floor communicate with the existing operating-theatre, so that the three form an operating-suite. A new pathological unit contains laboratories for chemists and pathologists, animal room, lecture-room, museum, post-mortem room and chapel. An extensive range of basements beneath the new and old buildings are intended in future to provide storerooms, but at present they are fulfilling a more useful function as an emergency casualty department and protected operating unit. A small admission block included in the scheme is also doing war-work as a unit for the treatment of injuries of the face and jaw.

MEDICAL STUDENTS IN U.S.A.

THE American medical schools have more applicants yearly than they can accept. From educational data appearing in the *Journal of the American Medical Association* (Aug. 31, p. 685) it seems that students entering in 1938–39 numbered 5754, and in 1939–40 the comparable figures was 5794. These are lower than the entries in the earlier part of the decade when they were always above 6000. The numbers reaching the fourth year of training, however, have remained about the same over the 10-year period, being 4909 in 1930–31 and 4894 in 1939–40. The loss of students during training therefore diminished from 1548 at the beginning to 833 at the end of the decade. In 1935–36 the number of students entering was 6005, of whom 1019 had dropped out by the end of the second year of training; but it is worthy of note that although in 1937–38 only 5791 freshmen were enrolled, only 870 of these had given up by the end of the second year; so that a decrease in the size of the entering class does not necessarily mean a corresponding reduction in those qualifying.

Of the 87 medical schools 2 have annual fees of under $100 (£25), 7 have fees between $100 and $200 (£25–£50) and 62 have fees ranging between $200 and $500 (£50–£125); in only 16 are the fees over $500. An odd position has arisen in relation to American students studying in Europe. In the spring of 1939 there were at least 500 over here, most of them studying at extra-mural schools in Scotland. The State Department decided to discontinue visas to the combat areas, with the result that the education of these students was interrupted. They applied to American schools, either to enter the 1939–40 class or for permission to join a class appropriate to the stage of education they had reached, but without much success; the overcrowded schools could not take them. A group of 390 students from Scottish schools formed an association and appealed to the educational agencies to find them places. The Council on Medical Education and Hospitals, however, decided that the individual medical schools must be allowed to determine whether to accept these transferred students or not, and other educational bodies have reached the same decision. The State Department agreed in March to issue visas for Switzerland, but he will be an intrepid student who thinks he can concentrate on medical studies in the middle of Europe today.

1. Krusen, F. H. *J. Amer. med. Ass.* Aug. 24, 1940, p. 605.
2. Nelson Loose Leaf Surgery, New York, 1936, vol. iii, p. 104.
3. *J. R. Army med. Cps*, 1940, 74, 277.

INTERNATIONAL LABOUR OFFICE.—An organising centre of the International Labour Office has now been established in McGill University, Montreal. Publications hitherto supplied to it should be sent to the director of the London office (at Cousens, Rudgwick, Sussex) for transmission to Canada.

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ORIGINAL ARTICLES

BLOOD SUBSTITUTES IN TREATMENT OF ACUTE HÆMORRHAGE

AN EXPERIMENTAL EVALUATION

BY

G. A. H. BUTTLE, M.R.C.S., MAJOR, R.A.M.C.

A. KEKWICK, M.B. Camb., M.R.C.P., CAPTAIN, R.A.M.C.

(From the Army Blood-Supply Depot)

AND

A. SCHWEITZER, M.D. Cologne, Ph.D. Lond.

(From the Department of Physiology, Middlesex Hospital)

IN uncomplicated cases of acute hæmorrhage early blood-transfusion effects complete recovery. In spite of this, such cases still die in civil practice because, during the time spent in obtaining and bleeding donors, irreversible tissue changes may take place and render treatment of no avail (Blalock 1934). At present, when there may be many casualties in a dozen different places at the same time, and when geographical relations between donors and recipients are disorganised, early treatment has become increasingly difficult. Storage of blood in banks has gone far to mitigate the delay, but until blood can be stored for longer than a few weeks blood banks are faced with the choice of being either wasteful or inadequate. There is need, therefore, for a blood substitute suitable for the treatment of the war wounded which can be stored for long periods, accumulated in large stocks, and be immediately available where casualties are likely to be received.

In this paper we consider the therapeutic value of various blood substitutes from the experimental standpoint and discuss the question of storage.

STANDARD CONDITIONS

The effects of various fluids in the treatment of acute hæmorrhage should be compared by observing the benefits produced by each under standard conditions. The experimenter has certain advantages denied to the clinician, for whom the collection of identical cases under standard conditions of bleeding and transfusion is impossible. Difficulties also beset the worker performing survival experiments, for though he can imitate clinical conditions fairly closely his results are based either on the crude test of percentage mortality or on uncertain observations. An experimental approach, therefore, employing a non-survival technique has been chosen as a preliminary to clinical assessment of the therapeutic value of blood substitutes.

Standardisation of experimental procedure demands a standard degree of hæmorrhage and standard conditions of transfusion. A standard degree of hæmorrhage should be one which produces a constant effect in all the animals used. It is insufficient to specify that a fixed proportion of the blood-volume should be removed, for the effects depend not only on the volume of blood lost but even more on the rate of loss. An animal may lose four-fifths of its blood-volume slowly and show no symptoms of hæmorrhagic shock, just as in man chronic hæmorrhage may produce no more than a slowly progressive anæmia. Loss of a fourth of the blood-volume very rapidly, on the other hand, may result in death. Again, removal of a fixed proportion of an animal's blood-volume at a fixed rate does not produce constant results because it makes no allowance for individual variations in reaction due to age and other factors. In order to allow for this, either the volume of blood removed or the rate of removal must be varied from animal to animal.

In this series cats were used. From experience gained with sixteen preliminary experiments it was decided to remove a fixed proportion (50%) of the calculated blood-volume at the fastest rate compatible with the animal being just alive at the end of the hæmorrhage. Each was finally reduced to a state where the blood-pressure was below 60 mm. Hg; little or no systolic-diastolic excursion was apparent and there was marked disturbance of respiration in the form of infrequent gasping breaths. This procedure ensures a degree of hæmorrhagic shock in which death is imminent and inevitable unless treatment is given.

In standardising the conditions of transfusion attention was given to the following points:

Time of starting reinjection.—Transfusion may be undertaken immediately after the cessation of bleeding or be delayed for some time in an effort to simulate clinical conditions. Delayed transfusion is unsatisfactory because the maintenance of blood-pressure at a level where tissue circulation is materially impaired produces irreversible changes (Blalock 1934); there comes a time when all treatment is of no avail. The exact moment at which this occurs and recovery becomes impossible cannot be judged in any individual animal, so that results obtained by comparing different treatment in a series of animals in which some have passed this point and others not may be confusing. Transfusion was therefore undertaken almost as soon as bleeding had ceased, so that the factor of irrecoverability was excluded from the results. There is no evidence to show that fluid which is ineffective when given immediately is effective when given at a later stage.

Volume of fluid injected.—If comparable results are desired the volume of fluid reinjected must bear a fixed relation to the volume of blood removed. If the same volume as was removed is replaced no allowance is made for the reserves of the animal which have been mobilised. The end-result may well be a blood-volume greater than normal. We arbitrarily decided to replace five-sixths of the volume removed.

Rate of reinjection.—The importance of standardising the rate of reinjection was seen during preliminary experiments, when different results were obtained with fluid injected rapidly and slowly. Too rapid transfusion—and it is easy enough for an operator with a 20 c.cm. syringe in his hand to give a transfusion too rapidly to a small animal—may produce cardiac embarrassment or other effects (Hirshfeld, Hyman and Wanger 1931). Too slow injection, on the other hand, prolongs the time during which the animal is subjected to a low blood-pressure. It was decided to inject all fluids at a rate of 2 c.cm. per kg. per minute. This means, in an average-size cat, a rate of 5 c.cm. per minute or a comparable rate in man of 120 c.cm. per minute—a not unreasonable rate after a severe hæmorrhage.

Anæsthesia was induced with a chloroform-ether mixture. Chloralose (70 mg. per kg.) dissolved in water was then slowly injected into the jugular vein. Blood-pressure was recorded from the carotid artery. Respiration was recorded by means of Wright's quantitative method (1934) or by means of a tambour. Animals were bled from a cannula in the femoral artery. Transfusions were made into the jugular vein.

Blood-pressure and respiration were recorded for a minimum period of 20 min. If both were stable throughout this period the experiment was begun. Blood was removed with a syringe from the femoral artery, watch being kept on the blood-pressure and respiratory tracings; 50% of the blood-volume, calculated as 6% of the body-weight (Erlanger 1921), was taken out in the fastest time compatible with the animal being just alive at the end of the removal (blood-pressure below 60 mm. Hg; marked respiratory disturbance.) Reinjection was started within 45 sec. and continued steadily at a rate of 2 c.cm. per kg. per min. until five-sixths of the volume of blood removed had been given. All reinjected fluids were sterile, and pyrogen-free solutions were used. The animals were left on a warm table for periods ranging from 90 min. to 6 hours. Blood-pressure and respiration were recorded every 15 min.

The return of the blood-pressure towards its initial level and the restoration of normal respiratory rate and rhythm are the signs by which the various transfusion solutions were judged.

CONTROL EXPERIMENTS

Control experiments of two types were made: in the first no treatment was given; in the second citrated whole blood was transfused into the animal.

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AVERAGE FINDINGS IN CATS AFTER BLEEDING AND TRANSFUSION

Fluid replaced	No. of expts.	Av. wt. (kg.)	Av. initial B.P. (mm. Hg)	Av. vol. blood removed (c.cm.)	Av. time of bleeding (min. sec.)	Av. B.P. end of bleeding (mm. Hg)	Av. resp. disturbance	Av. vol. fluid given (c.cm.)	Av. time transfusion (min. sec.)	Av. B.P. end of transfusion (mm. Hg)	Av. resp. disturbance	Average B.P. (mm. Hg) 15 min. later	30	45	60	75	90	Comments
(a) None ..	7	2·24	143	69	10·39	46	+	None	..	..	..	46	36	35	..	..	..	No survivals after 1 hour.
(b) Whole blood	5	3·35	159	101	8·8	33	++	83	13·38	122	0	135	130	128	131	136	133	No deaths.
(c) 0·9% sod. chloride	5	3·72	156	112	9·50	24	++	95	14·28	91	+	81	67	56	43	38	25	No survivals after 1 hour 40 min.
(d) 5·4% glucose	5	3·41	140	102	14·58	29	++	88·8	14·57	96	+	69	58	51	45	43	41	No survivals after 1 hour 40 min.
(e) 6% gum-saline	8	3·56	164	107	14·2	33	+++	93	13·50	123	0	99	90	80	85	83	83	3 died. Unstable B.P. and periodic breathing in survivors.
(f) 25% hæmoglobin-Ringer	5	2·94	157	89·6	6·28	52	++	74·5	13·44	140	+	146	143	133	130	128	122	Immediate results better than with gum-saline. Respiratory disturbance; B.P. unstable.
(g) Cell-saline suspension	6	2·96	155	90·0	8·20	31	++	75	13·20	108	+	104	95	83	78	73	60	3 animals died. Unstable B.P. and periodic breathing in survivors.
(h) Plasma ..	7	2·79	132	82·4	11·20	30	+++	70·3	14·23	103	0	112	111	106	104	110	111	Rise of B.P. maintained. Respiratory disturbance abolished.
(i) Serum ..	7	2·78	149	84·4	10·25	34	++	71·8	14·5	114	+	112	93	89	88	82	87	Reactions at start of transfusion in 5 out of 7 animals; 3 severe.
(j) Serum (dog expts.)	3	6·4	157	195	3·50	70	++	162	13·30	138	+	120	113	101	97	91	83	Reaction in 2 out of 3 at start of transfusion.
(k) Dried serum	3	2·6	135	78	14·40	45	++	66	13·10	98	+	95	91	95	95	88	85	All had reaction at start of transfusion.
(l) Dried plasma (Davie)	6	3·2	134	97	9·40	56	++	24·5	4·40	..	..	..	..	..	..	..	..	All died after an average of 24·5 c.cm.
(m) Dried plasma (Greaves)	3	3·1	147	95	8·3	47	++	79·2	13·0	105	+	115	115	125	120	115	118	All had reactions at start of injection; respiration did not return to normal in 2.
(n) Filtered plasma	5	3·23	136	98	10·10	30	++	81·0	13·20	107	0	114	118	121	120	115	120	No reactions. Results equal to those of unfiltered plasma.
(o) Plasma-saline	3	2·7	125	83	7·33	28	++	69·4	13·15	103	0	88	73	67	61	60	52	Initial rise of blood-pressure not maintained.

Animals in control group 1 all died within a short time (table *a*). There was some difference in individual reaction but the lower the blood-pressure fell the quicker death followed. The respiratory disturbance, blood-pressure and time of bleeding are recorded and can be compared with the average figures for the remainder of the series. It will be seen that a comparable degree of hæmorrhagic shock was produced throughout.

Animals in control group 2 were transfused with fresh whole blood from another cat (9 parts blood to 1 part 3% sodium citrate solution). Recovery after transfusion was almost complete (table *b*), both as regards the height of the blood-pressure and the restoration of normal respiratory rate and rhythm. These signs of recovery were sustained throughout the entire period of observation.

RESULTS

Crystalloid solutions.—The use of isotonic saline in the treatment of hæmorrhagic shock has many adherents in the clinical field. Its chief virtue is that it is easily and cheaply prepared. Table *c* shows the effects produced by the solution: after a period of recovery all the animals died.

Much has been written of the dangers of administering too much sodium chloride (Coller and Maddock 1936) and as a result glucose solutions have been increasingly used. Treatment with isotonic glucose (table *d*) gives almost identical results to those obtained with saline. Our results confirm the observations of other workers who found that crystalloid solutions pass easily from the circulation into the tissue spaces and are unable to raise the blood-volume for more than a brief time (Miller and Poindexter 1932; Roberts and Crendall 1933). Claims have been made that hypertonic solutions produce a greater effect but even they have been shown to leave the circulation relatively rapidly (Kinsman, Spurling and Jelsma 1928).

Gum-saline.—This was first popularised by Bayliss (1918) and the last war gave many opportunities for its use. Its value depends on the fact that a 6% solution has an osmotic pressure and viscosity approximating to that of whole blood. These factors have more recently been shown to be very variable and capable of being altered by the pH, the salts in solution, and even from sample to sample (Amberson 1937). The average results obtained with three different samples of gum-saline solution are shown in table *e*. Immediate recovery in all the animals was good, but there was a tendency for the blood-pressure to fall after the transfusion ended and 3 out of 8 animals died. The fall of blood-pressure may in part be explained by the fact that gum leaves the circulation relatively easily (Amberson 1937) but is more probably due to the specific action of the gum on the vessels, causing dilatation and increased capillary permeability (Drinker 1927). The effects of gum-saline were much better than those of saline or glucose, but were not as good as those of whole blood. The respiratory disturbance and unstable blood-pressure seen in some animals may have been due to the fact that gum coats the red cells and reduces their oxygen-carrying power (Christie, Phatak and Olney 1935). Recently Studdiford (1937) has published a condemnation of the solution from the clinical and experimental point of view.

Hæmoglobin-Ringer solution.—This solution, now used mainly for physiological experiments, is stated by Amberson (1937) to have the following advantages as a blood substitute: it exerts a high colloidal osmotic pressure; and the dissolved hæmoglobin takes up oxygen and stimulates hæmopoiesis. The solution used contained 3·7 g. of ox hæmoglobin per 100 c.cm. (known as "25% hæmoglobin-Ringer"). The immediate recovery of the blood-pressure was good, but there was a tendency for it to fall during the period of observation and to be highly unstable (table *f*). Some degree of respiratory disturbance persisted and even increased in all the experiments save one. We have concluded that the immediate results obtained are uncertain and not as good as those of whole blood. They are better than those obtained with gum-saline. The main disadvantage

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in the use of the solution, not illustrated by these experiments, is that the hæmoglobin leaves the circulation by way of the kidney within 48–72 hours (Amberson 1937) and during its passage down the renal tubules may produce renal obstruction (Baker and Dodds 1925). Aubertin and his colleagues (1939) describe renal and pulmonary lesions after the administration of hæmoglobin-Ringer solution to dogs, associated with a high mortality after some days.

Red cells in suspension.—One of the main advantages claimed for hæmoglobin-Ringer solution is that it is capable of carrying oxygen. In order to determine the importance of this factor in the treatment of hæmorrhagic shock it was decided to transfuse red cells suspended in isotonic crystalloid solutions. Blood was removed from a cat, centrifuged, the cells washed, and supernatant plasma replaced, volume for volume, by the crystalloid solutions. The suspension was then transfused into another cat. The immediate recovery after transfusion was good (table *g*) but the blood-pressure tended to fall and respiration was much disturbed in all experiments; 3 of the 6 animals died. The crystalloid solution probably left the circulation, and possibly the added red cells so increased the viscosity of the blood that its flow through vital centres was reduced. Rossius (1925) reports that red cells exert about the same resuscitating power as saline in the treatment of acute hæmorrhage.

Plasma.—It appears, then, that in hæmorrhage of this degree replacement of red cells plays no vital part in treatment. Even at the end of bleeding the animals still have approximately 50% of their original hæmoglobin, an amount sufficient to maintain life. Crystalloid solutions give a temporary recovery until the fluid leaves the circulation; thus, if the blood-volume is restored by the administration of fluid in a form in which it is held in the circulation permanent benefit should result. Both gum-saline and hæmoglobin-Ringer do this by virtue of the fact that they exert a colloid osmotic pressure equal to that of whole blood; both have the disadvantage that they produce toxic effects in the recipient. A suitable blood substitute would be a solution exerting such a colloid osmotic pressure and not producing toxic effects, as Rous and Wilson (1918), Amberson (1937) and others have already concluded.

Theoretically, plasma or serum should be the ideal solutions. Table *h* shows the effects of transfusing plasma (obtained from citrated blood: 9 parts of blood to 1 part of 3% sodium citrate solution). The rise of blood-pressure and abolition of respiratory disturbance closely resemble the effects obtained with whole blood. Two of these experiments were continued for over 3 hours and one for almost 6 hours, without there being any fall of blood-pressure. It is safe to state that, with hæmorrhage of this degree, replacement with plasma gives as satisfactory a result as replacement with whole blood. On the other hand, it must be remembered that as the volume of hæmorrhage increases the loss of red cells becomes more important and plasma transfusions of less value. These findings accord with those of Mahoney (1938) and Peyton Rous and Wilson (1918).

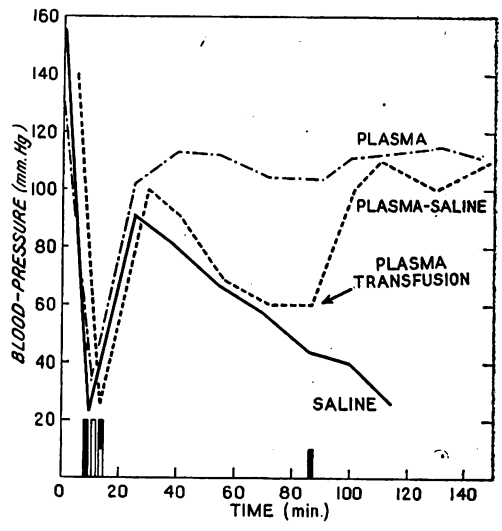
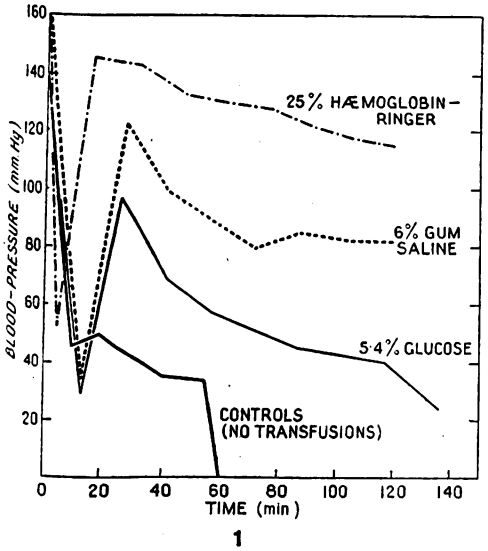


FIG. 3—Average behaviour of blood-pressure of animals transfused with plasma (7 experiments), saline (5 experiments) and plasma-saline 1:1 (3 experiments). The plasma-saline tracing also demonstrates the effect of a further transfusion of plasma, suggesting that recovery depends on the colloid osmotic pressure of the plasma. The black and white columns represent the relative volumes of plasma and saline transfused.

Serum.—In theory serum should give results as satisfactory as plasma because it has a similar colloid osmotic pressure; from the practical point of view it has the advantage of being more easily prepared. Table *i* shows the results of transfusion with fresh untreated cat serum. It is noteworthy that 5 out of the 7 cats had a reaction soon after the beginning of the transfusion; the respiration ceased, or almost ceased, and the blood-pressure fell sharply; 3 of these reactions were very severe and the animals looked like dying. Moreover, the blood-pressure, after recovery from the reactions, declined again in all animals.

Brodie (1900) observed reactions after serum injection in cats and stated that he was unable to obtain these in other animals. Three similar though not identical experiments which we carried out on dogs produced both a comparable immediate reaction and a subsequent drop of blood-pressure (table *j*). We concluded that some toxic substance absent from plasma was present in serum. The literature discussing the liberation of physiologically active substances in serum has been reviewed by Amberson (1937) who states that "blood plasma is to be preferred to serum because of the formation, in the latter, of vaso-dilator or constrictor substances produced in the act of clotting." A similar conclusion on the toxicity of serum seemed to have been reached by Brodin and St. Girons (1939), Doan (1927) and others.

We thought that the process of drying might remove such substances, and undertook three experiments using serum which had been dried and then redissolved in water. The results were much the same as those already described (table *k*). Bond and Wright (1938) and Levinson, Neuwelt and Necheles (1940) have reported reactions when using dried serum, while Best and Solandt (1940b) say that "in experimental work sera which produce undesirable reactions are discarded." The



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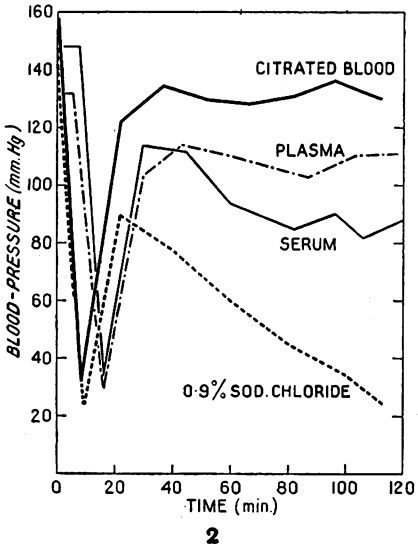

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FIGS. 1 and 2.—Blood-pressure readings after rapid removal of 50% of the calculated blood-volume and immediate replacement with various fluids.

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same investigators have concluded that serum gives satisfactory therapeutic results in animals. In none of their papers has the action of serum been contrasted under standard conditions with that of plasma.

DISCUSSION

We have placed the substitutes used in the following order of therapeutic value: (1) plasma; (2) serum; (3) hæmoglobin-Ringer; (4) gum-saline; (5) red cells suspended in crystalloid solution; and (6) isotonic saline or isotonic glucose.

Charts 1 and 2 summarise the blood-pressure readings after replacement with various fluids. Additional effects such as renal damage or respiratory disturbance are not shown.

Plasma was the only substitute whose value consistently approximated to that of whole blood in the treatment of hæmorrhage. The remaining substitutes gave inferior results. Hæmoglobin-Ringer was the most effective of the solutions after plasma and serum, but it must be remembered that hæmoglobin solutions produce renal changes, and for this reason gum-saline or even saline might prove more satisfactory in practical resuscitation.

Certain difficulties still present themselves in the preparation and storage of plasma, the most formidable being the ease with which it becomes infected. In order to overcome this, methods of removing water from the plasma and keeping it as a dry powder have been evolved. Recently Edwards, Kay and Davie (1940) have published a method of drying at 37° C. under low pressure, and the M.R.C. Serum Drying Unit, Cambridge, dry from the frozen state by a modification of the method employed by Flosdorf and Mudd (1938). Fresh cats' plasma (citrated) was pooled and divided into two parts, one of which was sent to Dr. T. B. Davie and one to Dr. Greaves at Cambridge. Table *l* and *m* show the effects obtained with these plasmas after they were made up to their original volume with sterile pyrogen-free water immediately before transfusion. It can be seen (table *l*) that Davie's method appears to produce changes in the plasma which cause a drop in blood-pressure, sufficient to kill these very shocked animals. Cats with a normal blood-pressure given 15 c.cm. of this plasma showed a temporary drop of 30–40 mm. Hg. Plasma dried from the frozen state seems to give fairly satisfactory results but is therapeutically inferior to the undried plasma (table *m*).

Another method of eliminating infection from plasma is by filtration. The method of filtration described by Bushby, Buttle and Whitby (1940) appears neither to detract from the resuscitating properties of the unfiltered plasma nor to add any toxic products to it. Table *n* shows the results obtained with cat plasma treated by this method; from the experimental point of view this appears to be the best method of overcoming the problem of infection.

Another method used in preparing plasma is to dilute it with an equal volume of normal saline. After the administration of such diluted plasma (table *o*) the blood-pressure at first rises and then drops, presumably as the crystalloid solution leaves the circulation. It can be restored to its normal level by a further transfusion of whole plasma equal in volume to the saline diluent (chart 3). If it is possible to overcome the difficulties of infection and storage, plasma containing a little anticoagulant is superior to either dried or diluted plasma.

CLINICAL APPLICATION

There can be little doubt that saline and glucose behave in man as they do in these experiments. There is also evidence that gum-saline (Keith 1919, Amberson 1937) and hæmoglobin-Ringer solutions (O'Shaughnessy, Mansell and Slome 1939) have the same effects when administered intravenously in man as in cats and are open to the same objections. The literature on plasma transfusions is scanty, but available work indicates that results comparable to ours have been obtained in clinical practice (Strumia, Wagner and Monaghan 1940, McClure 1939, Lehman 1939, Brodin and St. Girons 1939, Brennan 1940, Tatum, Elliot and Nassett 1939).

The relative merits of plasma and serum seem important. In the cat we have found two experimental objections to the use of serum: immediate reactions are more numerous than with plasma, and the return of the blood-pressure is not sustained. Various workers (Ravdin, Stengel and Prushankin 1940, Aldrich et al. 1938, Strumia, Wagner and Monaghan 1940) report reactions with serum in man. Strumia and his colleagues claim that these reactions were not seen when plasma was used, and prefer it for that reason. Drury (1940), on the other hand, claims that the incidence of reactions is no higher with serum than with whole blood. It may be that this difference can be explained by differences in methods of preparation. No data is yet available from human cases as regards the subsequent drop of blood-pressure.

Results with dried plasma seem to differ in man from those encountered in these experiments. Strumia, Wagner and Monaghan (1940), using plasma dried by the Flosdorf and Mudd method, report no reactions in human patients, while Davie (1940) has not encountered, in a small clinical series, the extreme reactions described above. More clinical data are required with plasma dried by both methods, especially in relation to patients with very low blood-pressures.

The Army Blood Transfusion Service (1940) has had encouraging results with filtered plasma in severe cases of shock and hæmorrhage. If the results of using saline are comparable in clinical and experimental work there is little reason to suppose that plasma-saline gives different results than those reported above.

Many people may soon have to make an immediate choice of a blood substitute for the treatment of wounded. The weight of evidence in the clinical, as in the experimental, field is at the moment in favour of using filtered plasma containing as little crystalloid diluent as possible. The success of a blood substitute depends on the elimination of delay between hæmorrhage and treatment; and this in turn depends on the substitute being suitable for storage over long periods. The question is, does plasma fulfil this condition? There is little literature on the use of plasma after storage, but what evidence there is—all of it clinical—suggests that plasma can be satisfactorily stored (Brennan 1940; Strumia, Wagner and Monaghan 1940; Tatum, Elliot and Nasset 1939; Army Blood Transfusion Service 1940). We believe that a strong case has been made out for extensive preparation and subsequent clinical trial of such plasma.

SUMMARY

Since blood cannot usefully be stored for longer than a few weeks a substitute capable of being accumulated in large stocks is needed.

Under standard experimental conditions the therapeutic actions of various blood substitutes have been compared with those of whole blood and the conclusion is reached that plasma is the only one which, in the cat, consistently gives results approximate to those obtained with whole blood. The other substitute solutions we place in the following descending order of value: serum, hæmoglobin-Ringer, gum-saline, red cells in crystalloid solution, isotonic saline, isotonic glucose.

We conclude that filtration is the best method of overcoming the danger of plasma infection.

We wish to thank Colonel L. E. H. Whitby, Prof. Samson Wright, Dr. A. N. Drury and Major H. L. Marriott, R.A.M.C., for their advice and criticism; Prof. R. J. Brocklehurst for facilities in the physiological department of Bristol University; Dr. J. W. Trevan for facilities in the Wellcome Physiological Research Laboratories and Dr. A. C. White for his collaboration there; also Dr. R. I. M. Greaves and Dr. T. B. Davie, who kindly dried serum and plasma for us. One of us (A. K.) gratefully acknowledges financial assistance from the Leverhulme Trust both before the war and since.

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NUTRITIVE VALUE OF WHITE FLOUR WITH VITAMIN B_1 ADDED AND OF WHOLEMEAL FLOUR

By HARRIETTE CHICK, C.B.E., D.Sc. Lond. and Manc.

(From the Division of Nutrition, Lister Institute)

THE experiment here described was made in consequence of the proposal made from the Ministry of Food to reinforce the white flour used for making bread by adding pure vitamin B_1, in order to make its nutritive value more nearly equal to that of wholemeal. White flour contains much less vitamin B_1 than wholemeal flour, but this is only one of a series of relative defects. These were enumerated recently in a manifesto issued from the Accessory Food Factors Committee of the Lister Institute and Medical Research Council, which recommended that flour used for making bread should contain at least 80–85% of the wheat grain, the outer layers of the bran and cuticle only being rejected (see *Lancet*, Aug. 3, 1940, p. 143). Ordinary "straight-run" white flour (73% extraction) is not only poorer than wholemeal flour in vitamin B_1 but also has a lower content of B_2 vitamins, minerals and protein. Further, experiments carried out in this division have shown the combination of proteins in wholemeal flour to have a higher nutritive value for growth, weight for weight, than those of the endosperm.

The vitamin-B_2 complex includes (1) riboflavin, (2) nicotinic acid, (3) vitamin B_6 and (4) the substances grouped under the name "filtrate factor." One of the filtrate-factor group has been isolated in a pure state as pantothenic acid; this group also contains a substance or substances known to be connected with the prevention of certain forms of anæmia. Nos. (1) and (2) certainly, and Nos. (3) and (4) probably, are vitally concerned in human nutrition. All are essential for nutrition of the pig and dog, and all except nicotinic acid are needed for satisfactory growth and health of the rat.

It therefore seemed worth while to compare experimentally the nutritive values of white and wholemeal flour, when the deficiencies of the former in vitamin B_1, in fat-soluble vitamins, in protein and in minerals were made good but any difference in B_2 vitamins was uncorrected.

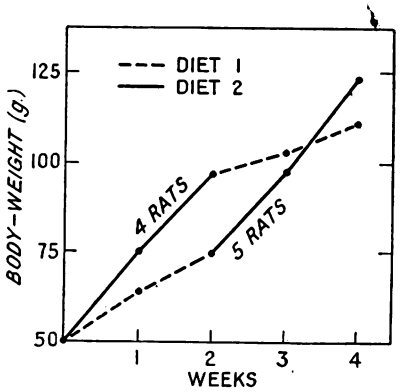
EXPERIMENTAL DETAILS AND RESULTS

Two diets were arranged, consisting as largely as possible of white flour and wholemeal flour respectively, with the addition of a salt mixture to remedy the known defects of cereals in this respect and of extra protein in the form of casein to bring the amount of protein in the diet up to the optimum proportion for the growing rat. Pure vitamin B_1 in optimum amount was given to the rats on the white-flour diet. The diets had the following composition:—

DIET 1 (white flour)	%	DIET 2 (wholemeal)	%
Straight run white flour, 73% extraction	88	Wholemeal flour	82
Casein, purified	6	Pure maize starch	6
Cotton-seed oil	4	Casein, purified	6
Salt mixture (McCollum No. 185)	2	Cotton-seed oil	4
With 10 μg. pure vitamin B_1 and 80 mg. cod-liver oil daily.		Salt mixture (McCollum No. 185)	2
		With 80 mg. cod-liver oil daily.	

The samples of wholemeal flour and straight-run white flour (73% extraction such as is generally used for making white bread) were obtained from the same grist. This was a mixture of Manitoba, Australian and other wheats, being milled for general use in a large commercial flour mill. The protein contents (N × 5·7) of the white and wholemeal flours were 12·1 and 13·0%. Purified casein, 6%, was added to each diet and the proportion of protein in the final ration reckoned on dry weight (dried at 105–110° C.) was 18·5% in diet 1 (white flour) and 18·3% in diet 2 (wholemeal). To the diets when prepared 60 c.cm. of water was added to every 100 g. of mixture and the whole cooked by steaming for about an hour, since this was known to make cereal diets more acceptable and better utilised by rats (Boas-Fixsen, Hutchinson and Jackson 1934).

A litter of nine young rats (Norwegian pied Lister Institute strain), immediately after weaning and of weight ranging from 37 to 41 g., received a complete synthetic diet for a week, after which the weights had increased to from 47 to 54 g. At this stage they were divided into two groups. Five (2 male, 3 female) received diet 1 with 10 μg. pure vitamin B_1 in solution and 80 mg. cod-liver oil daily, these being given separately with a dropping pipette to each animal. The four rats (2 male, 2 female) having diet 2 received 80 mg. cod-liver oil daily.



Average rate of growth in the two groups of rats.

The rats were kept in cages raised on metal supports above trays containing the usual bedding, the floors of the cages being made of open-mesh wire to hinder the rats from eating their fæces. The lower tray was covered with a perforated zinc sheet, on which was placed two thicknesses of filter paper to catch any fragments of the food that might be scattered. These were separated from the fæces, dried at 105–110° C. and the dry weight subtracted from that of the food given, in order to estimate the food intake. The fæces were also collected, moistened with N/10 sulphuric acid to prevent loss of ammonia, dried and weighed. For the first two weeks two rats were together in one cage, after this all were kept in separate cages.

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The results are set out in the table and figure. During the first two weeks the average weekly weight increase on the white-flour diet (11·8 g. weekly) was about half of that on the wholemeal diet (22·8 g. weekly). The food intake in the former case was also less, the average being 35·3 g. dry weight of food as compared with 53·2 g. on the wholemeal diet. The digestibility of the white flour was superior, the weight of fæces passed being only about a fifth of that passed on the whole-meal diet, but the utilisation of the assimilated food was inferior; the

EXPERIMENTAL FINDINGS IN RATS ON DIET 1 (WHITE FLOUR WITH VITAMIN B_1 ADDED AND DIET 2 (WHOLEMEAL). BOTH DIETS CONTAINED ADDITIONAL PROTEIN, AS CASEIN, AND COD-LIVER OIL

Week of expt.	No. of rats	Diet	Av. weekly increase in wt. (g.)	Av. weekly food intake dry wt. (g.)	Av. dry wt. of fæces (g.)	Dry food ingested corresponding to 1 g. wt. increase (g.)	Dry food assimilated corresponding to 1 g. wt. increase (g.)
1	5	1	12·6	33·8	1·11	2·70	2·59
2			11·0	36·8	1·12	3·34	3·24
3		2	23	54·5	5·32	2·37	2·14
4			25	63·2	6·49	2·53	2·27
1	4	2	25·5	49·7	4·83	2·15	1·76
2			20·2	56·7	5·82	2·80	2·51
3		1	5·6	53·1	2·43	9·24	8·82
4			9·5	55·3	1·87	5·82	5·63

average weight of dry food ingested during this period of two weeks corresponding to 1 g. increase in body-weight was 3·02 g. on the white-flour diet, while on the wholemeal diet it was 2·47 g. When allowance is made for the loss in the fæces these figures become 2·91 and 2·13.

At the end of the second week the diets were changed. For the next two weeks the five rats previously taking diet 1 received diet 2. They made an immediate spurt in growth with average weekly weight increase of 24 g., while those changed from diet 2 to diet 1 suffered an immediate check, the average increase falling to about 7 g. a week.

The inferiority of white compared with wholemeal flour shown in this experiment must be attributed to a shortage of the B_2 vitamins. Further work is now in progress to determine in which constituents of this complex white flour is most seriously deficient. Preliminary trials indicated that in diet 1 deficiency of riboflavin was probably the most serious, though lack of filtrate factor may also have limited growth. It is not likely that lack of vitamin B_6 was responsible, for cereals are known to be good sources of this vitamin (Birch, György and Harris 1935), which is distributed throughout the grain. Its presence has been demonstrated in starches of cereal origin, even when these have been highly purified (Chick, Macrae and Worden 1940).

SUMMARY

The nutritive value of straight-run white flour (73% extraction), tested on young growing rats, has been found inferior to that of wholemeal flour, even when the defects of the former in protein, minerals and vitamin B_1 have been corrected. The inferiority must be attributed to lack of B_2 vitamins. Experiments are now in progress to determine in which member or members of this group white flour is most seriously deficient.

I wish to acknowledge gratefully the assistance of the Research Association of British Flour Millers in procuring the samples of white and wholemeal flour; also the help of Mr. G. Flynn in the care of the animals. The work was made possible by the hospitality of Sir Charles Martin, at whose invitation the Division of Nutrition of the Lister Institute moved from London to Roebuck House, Chesterton, Cambridge, at the outbreak of war.

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SUBACUTE BACTERIAL ENDOCARDITIS TREATED WITH SULPHAPYRIDINE AND HEPARIN

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The encouraging results recently reported by Kelson and White (1939) in the treatment of subacute bacterial endocarditis by the use of sulphapyridine and continuous 14-day heparinisation of the blood, may lead to its further trial in cases in this country. Difficulties encountered in a case recently treated by this method seem worthy of record. The object of the heparinisation is to restrict further thrombotic deposition on the cardiac valves and thus "to restrict the nidus and culture medium for bacterial growth, to prevent embolism from the freeing of fresh thrombus, and to check the growth of the vegetations so that proliferating fibroblasts may fill in the area thus limited." At the same time, and for a week before and after the 14 days of heparinisation, sulphapyridine is given for its bacteriostatic action.

CASE-HISTORY

A professional man had had chorea as a child and was known to have aortic and mitral valvular lesions. He led an active life until six weeks before admission to hospital, when he felt unwell and took to his bed. Thereafter he was feverish but his only other definite symptom was a patch of blindness in the right eye which developed ten days before his admission. A blood-culture a week before admission grew a *Streptococcus viridans*. For five days before admission he had taken 5 grammes of sulphapyridine daily.

On admission on Dec. 12, 1939, he was afebrile with pulse-rate 70 and respiration-rate 20. He looked ill, had a sallow complexion and was rather drowsy. There was a small hæmorrhage close to the right macula. A rough presystolic apical murmur and a high-pitched diastolic aortic murmur were present. The spleen could just be felt. On the 14th the sulphapyridine was discontinued, and the temperature began to rise to 100° F. in the evenings. Blood count: Hæmoglobin, 82%; red cells, 3,900,000; white cells, 10,000 (polymorphs, 80%). The urine contained a few red cells.

During the course of the next week a blood-culture showed the presence of *Streptococcus viridans*, and a shake culture yielded an average of 57 colonies per 1 c.cm. The temperature was still rising to 100° F. in the evenings, and a few petechial spots had appeared.

Since infective endocarditis due to *Streptococcus viridans* is almost invariably fatal, and since sulphapyridine or allied substances alone have not hitherto produced a permanent cure, it seemed justifiable to try treatment with heparin in addition to sulphapyridine.

On Dec. 22 1 g. sulphapyridine was given 4-hourly for 24 hours and thereafter continued 6-hourly; 300 mg. ascorbic acid was given daily for 3 days. The temperature came down to normal at once, but after two days began to creep up to 100·5° F. in the evenings. On Dec. 30 the clotting time (modified method of Lee and White) was 8 min. An intravenous infusion of normal saline was started into a vein in the left leg, 12,500 units of heparin A (see below) being added to each pint of saline. The rate of flow was 20 drops per min. (20,000 units in 24 hours). Next day the patient had two rigors, the temperature rising to 103·5° F. Clotting time: 5 minutes. On Jan. 1, 1940, the drip stopped owing to thrombosis in the vein. The cannula was removed and inserted into the other leg. Fresh heparin direct from the manufacturers was used in the same concentration, but the rate of drip was increased to 30 drops per minute. Next day the patient had two rigors (T. 103° F.). Clotting time, 5 min. On the 3rd the clotting time was 6 min. In the afternoon the drip stopped again owing to venous thrombosis. Next day the cannula was inserted into the right arm. The concentration of heparin was raised to 15,000 units per pint and the rate was kept at 30 drops per minute. Platelet count: 374,000. On the 5th the clotting time was 4 min. In the evening the drip stopped owing to venous thrombosis.

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Treatment had been continued up to this point in the hope that with prolonged therapy success would be achieved, for the dose of heparin that had been used was greater than that used by Kelson and White (1940). But after the third failure it was decided that the heparin must be at fault, and all treatment was suspended while tests were carried out on the brand of heparin which had been used (heparin A), a specimen bottle obtained from another firm (heparin B) and some solution of crystalline heparin which had been sent to Prof. R. W. Christie by Prof. C. H. Best from the Connaught Laboratories at Toronto (heparin C). These tests, performed on the blood of nine convalescent patients, showed that the advertised units of the three brands of heparin bore no relation to their relative anticoagulant activity. One unit of heparin C was found to be approximately equivalent to 5 units of heparin B and to 20 units of heparin A (see table).

RELATIVE VALUES OF HEPARINS A, B AND C

—	Units of heparin required to prolong clotting time of 2 c.cm. blood in vitro to—		
	20 min.	30 min.	40 min.
Heparin A	9	21	37
Heparin B	2	5	10
Heparin C	0·5	1	1·5

After these experiments had been completed, my attention was drawn to the decision of Murray and Best (1938) to change the size of the heparin unit to five times that previously used. The advertised unit of heparin C was presumably on this new scale. This accounted for the difference between heparin C and heparin B. The further difference of heparin A remained unexplained. The reason for the failure of our attempts at heparin therapy in the present case was now obvious and it was decided to make a further attempt, using heparin C.

By this time the patient was considerably worse, he was developing frequent and extensive petechial spots, had pains in several joints and an attack of severe and persistent pain in the left side suggested a splenic infarct.

On Jan. 19 a shake culture of the blood gave an average of 159 colonies of *Streptococcus viridans* per 1 c.cm. The white-cell count was 9000. On the 22nd sulphapyridine, 1 g. six-hourly, was started, and the temperature which had been rising to 101° F. in the evenings fell to normal for two days, but thereafter began to creep up to 101° F. again. Petechial spots continued to appear. On the 28th shake culture of the blood yielded an average of 22 colonies per 1 c.cm. At noon an intravenous infusion of normal saline containing 10,000 units of heparin C to the pint was started into the left arm; the rate of flow was 18 drops per minute. Shortly *before* the infusion the patient had a mild rigor which sent the temperature to 102° F. After one pint had been given the clotting time was 5 min. and the rate of flow was increased to 30 drops per min. Next day, 20,000 units of heparin having been given in 24 hours, the clotting time was 6½ min. The concentration of the heparin in the infusion was increased to 13,000 units per pint, and the rate of flow was increased to 40 drops per min. A rigor followed by a rise of temperature to 104° F. occurred an hour after the increase in rate of flow. On the 30th 26,000 units having been run in during 16 hours, the clotting time was 22½ min. The rate of flow was maintained at 40 drops per min. During the night there was another rigor with a rise of temperature to 104° F. The cause of these rigors remained unexplained. On the 31st 50,000 units had been run in during 24 hours and the clotting time was 21 min. The rate of flow was maintained, the patient remaining comfortable. At 2 A.M. next morning he woke with violent headache and vomiting, followed by incessant retching. He became rapidly exhausted and died after two hours.

Post-mortem findings.—The body was well nourished and showed generalised pallor. There was a slight increase of fluid in the peritoneal cavity. The lungs were congested and œdematous. In the heart, there was some old thickening of the visceral pericardium; the valves on the right side were normal; on the left side there was some thickening and shortening of the chordæ tendineæ with papillomatous, semi-organised thrombus attached. The aortic valves were bicuspid, thickened and roughened at the margins, and on the line of closure there were pale firm projections one of which felt gritty in character. The spleen was large and had an infarct measuring 5 cm. by 5 cm. against the abdominal wall. The digestive system was normal. The left kidney was rudimentary. In the brain there was a small subarachnoid hæmorrhage in the occipito-parietal region, a hæmorrhage in the left frontal lobe and also one in the left lobe of the cerebellum. These hæmorrhages were the cause of death.

DISCUSSION

To render the blood of a patient less coagulable when he is suffering from a disease in which emboli are common is to run the risk of serious hæmorrhage. In many cases of infective endocarditis, however, administration of sulphapyridine temporarily sterilises the blood-stream and abolishes embolic signs. Thus the week of therapy by sulphapyridine alone, recommended by Kelson and White (1939), before starting the heparin, acts as a safeguard against serious hæmorrhage. In the present case this safeguard failed, for a positive blood-culture persisted and petechiæ continued to appear while the sulphapyridine was being given.

Three other cases have been reported in which hæmorrhage occurred during heparin treatment of subacute bacterial endocarditis—Kelson and White's fourth case, the case of Friedmann, Hamburger and Katz (1939) and that of Witts (1940). In all these sulphapyridine had failed to sterilise the blood. Out of the five other cases so far reported (all by Kelson and White) to have survived heparin treatment, only one had a positive blood-culture at the beginning of the heparinisation. In this case no improvement was obtained.

The conclusion suggested by this small series of cases is that the persistence of a positive blood-culture, and in particular the continued appearance of embolic signs, should contra-indicate heparin treatment. Swain (1940) using in-vitro tests in support of clinical findings demonstrated that some strains of *Streptococcus viridans* are susceptible to sulphapyridine, while others are unaffected. He suggests that heparin treatment should only be undertaken when such tests show that the infecting strain of *Streptococcus viridans* is amenable to chemotherapy.

The first attempt, in the present case, to make the patient's blood less coagulable failed; but a second attempt, made after in-vitro tests had been carried out, was successful. These tests suggested that the advertised units of different brands of heparin are widely different from each other; this is not surprising in view of the fact that the three brands investigated are standardised by different methods. Murray and Best (1938) have recently changed the value of their unit and standardise on a basis of weight of their crystalline material, while the other two brands still use the original unit but have different biological methods of standardisation. My tests also suggested that there is a variation in the activity of the same brand of heparin in different individuals. In view of these facts it is suggested that before heparin therapy is instituted in any case it may be helpful to determine by in-vitro tests the approximate amount of heparin that will be required to produce an adequate prolongation of the patient's clotting time. In the present case, where one unit of heparin added in vitro to 2 c.cm. of the patient's blood raised the clotting time to 3½ times its initial value, 50,000 units had to be given intravenously in the course of 24 hours to produce a fourfold prolongation of clotting time in vivo.

SUMMARY

A case of subacute bacterial endocarditis is described in which treatment by sulphapyridine and heparin was attempted, but the patient died from cerebral hæmorrhage.

This treatment is attended by a risk of vascular accidents. The cases so far published suggest that this risk may be greater when a preliminary course of sulphapyridine fails to sterilise the blood and to stop embolic signs.

An investigation into the relative activity of three different brands of heparin was made. There appeared to be a wide divergence in the activity of the advertised units. This disparity is at least in part attributable to

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the fact that the methods of standardisation of these brands are all different.

I wish to thank Dr. E. R. Cullinan for his advice and for permission to publish this case; Professor Christie and Prof. L. J. Witts for their advice; and Dr. Joan Ross for the account of the autopsy.

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LATE EFFECTS OF SUBDURAL HÆMORRHAGE

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A study of 54 cases recorded in the files of the division of neuropathology, University of Toronto, has shown various types of clinical picture which may be produced by hæmorrhage into the subdural space.

Free hæmorrhage into the subdural space is a common incidental finding in cases of severe and rapidly fatal head injury. The hæmorrhage is usually seen as a film of blood, $\frac{1}{10}$–$\frac{1}{8}$ in. thick, evenly disposed in the subdural space covering the convex lateral surfaces of the cerebral hemispheres. In a considerable number of such cases the cause of the hæmorrhage is the traumatic rupture of a cerebral vein, most usually one of the superior cerebral veins as it crosses the subdural space to empty its blood into the superior sagittal sinus. Leary (1934) points out, however, that there are cerebral veins which cross the subdural space to reach the dura at a distance from one of the major venous sinuses, and if these are ruptured they will produce subdural hæmorrhage in atypical situations. The hæmorrhage is as a rule found over the hemisphere on the side which has received the injury, but in 8 of the 54 cases of this series the subdural hæmorrhage was over the opposite hemisphere only. Contre-coup subdural hæmorrhage is, therefore, an anatomical possibility in cases which show clinical evidence of cortical compression of the hemisphere on the side opposite to that of the injury. The hæmorrhage was bilateral in 12 cases.

CHRONIC TRAUMATIC SUBDURAL HÆMATOMA

The following 3 cases are reasonably typical of chronic traumatic subdural hæmatoma. This condition can be caused by a minor head injury which produces no other significant intracranial damage. The result of evacuation of the blood-clot is therefore as a rule satisfactory. The interval between injury and operation has varied in this series from eight days to nine years, the average being a few months.

Case 1.—A man of 64 had a slight injury to the left side of his head in February, 1932. He had more or less persistent headache, gradually becoming more severe, until early in June when he developed a right hemiplegia with some aphasia. The optic discs were choked. On June 20 a left subdural hæmatoma was evacuated through a burr-hole. Unsatisfactory convalescence led the surgeon to explore the right subdural space, from which a small hæmatoma was evacuated on July 1. After this the patient made a satisfactory recovery.

In cases in which the localising signs are not clear-cut it has become increasingly the rule in recent years to explore the subdural space on both sides by bilateral burr-holes. The following is an illustrative case.

Case 2.—A man of 66 received a minor blow on the back of his head in June, 1937. He was somewhat dazed for about an hour but recovered completely. Three months later he began to have attacks of bilateral frontal headache in some of which he vomited. At first the headaches disappeared if he rested in bed. They gradually became more severe, and came on every other day. There was some diminution of mental acuity for two or three weeks before his admission to hospital on Dec. 31. The only lateralising sign was a questionable left facial weakness. There was no papilloedema. A burr-hole in the right anterior temporal region made on Jan. 3, 1938, showed the dura mater to have the blue colour typically seen when a hæmatoma underlies the membrane. Exploration through a burr-hole on the left side showed no abnormality. The hæmatoma on the right side was then evacuated. The patient is still alive but shows considerable residual disability.

The following case, which came to autopsy, illustrates the gross pathological findings.

Case 3.—An inmate of a home for old men, aged 86, fell out of bed, fracturing his femur. He died of bronchopneumonia five days later. At the autopsy old bilateral frontal subdural hæmatomata were found which had obviously been present for a long time before the recent injury. They are illustrated in fig. 1, the more extensive hæmatoma being on the right side. Fig. 2 shows the atrophy of the frontal cortex underlying the hæmatomata, especially on the right side. The horizontal section through the cerebral hemispheres in fig. 3 demonstrates compression of the frontal cortex, more obvious on the right side. There is considerable senile arteriosclerotic thickening of the vessels in the subarachnoid space, and senile internal hydrocephalus is visible in the anterior horns of both lateral ventricles.

This third case was complicated by the patient's extreme age and by the presence of senile degenerative changes in his brain. No record of the injury which produced the hæmatomata could be obtained, and he falls, therefore, into a group of cases of subdural hæmatoma with no history of trauma. No information is available regarding any change in this patient's mental status after his admission to the institution two years before his death.

CASES WITH MENTAL SYMPTOMS

The important relationship between cortical compression by subdural hæmatoma and the onset of mental deterioration is illustrated by the following two cases. In the first mental deterioration began soon after the accident. In the second its onset was long delayed but traceable to a head injury.

Case 4.—A man, aged 61, was hit on the right upper part of the forehead by a steel cylinder in November, 1933. This rendered him confused and unsteady but he did not leave his work and the slight wound healed in a week. A fortnight later he began to suffer from headache which became very severe within a few days and was accompanied by tenderness of the right side of the scalp. He took large quantities of aspirin and remained at work. Five months after his injury, in April 1934, he became irritable and would often scream with the severity of the headache. He remained in bed for a week and then returned to work. From this time, however, he was mentally dazed. He would fall asleep at night on his return from work, sometimes in the middle of a meal, and he was difficult to arouse in the mornings. His irritability increased so that he was difficult to live with and he became careless about his table manners and dress. On June 4 his foreman sent him home, and next day his mental confusion became extreme. He urinated on the floor and ate his meals with his fingers. Later in that day he was found in a state of semi-collapse in a neighbour's garden which he had entered by mistake. He was certified and admitted to a psychiatric hospital. An encephalogram on June 13 showed displacement of the lateral ventricles to the left and the procedure was followed by a mild left hemiplegia which cleared up in 24 hours. A large right subdural hæmatoma extending backwards from the frontal pole almost to the occipital pole was evacuated by operation on the following day, but the patient continued to show symptoms of disturbed mentality until his death some years later.

Case 5.—A man received a head injury in an aeroplane crash in October, 1927. He had a short period of unconsciousness but apparently recovered completely. During the succeeding years he became severely depressed, with lack of interest and loss of initiative. The depression culminated in attempted suicide in October, 1938. A revolver bullet, fired obliquely, produced a depressed fracture in the right temporal region, with no penetration of the skull by the bullet. Four weeks later this area was explored by operation and the fragments of the depressed fracture were removed. Incision of the dura mater revealed a large mass of fibrous tissue, containing old blood-pigment, in the subdural space. Histological examination showed this lesion to be a subdural

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FIG. 1—Bilateral old subdural hæmatomata from below. The more extensive hæmatoma is seen on the right side. (Case 3.)

hæmatoma of long standing. After the operation the patient's mental condition has much improved, though he still suffers a good deal of disability from his left hemiplegia.

In this case the finding of an old subdural hæmatoma was completely unexpected. Its successful removal nine years after the accident which produced it is of great interest.

INFECTED HÆMATOMA

Infection of a subdural hæmatoma is a very unfortunate complication, which, though rare in civilian

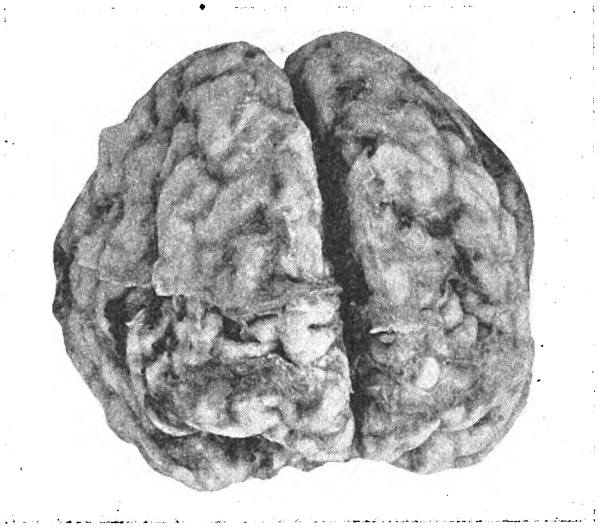

FIG. 2—Brain viewed from front, showing cortical atrophy by compression of overlying subdural hæmatomata, greatest on right side (left of photograph). (Case 3.)

injuries, may be expected to be fairly common in war wounds where the hæmatoma may be in direct continuity with a septic compound comminuted fracture of the skull. Only two such cases were found in this series, one of which is here described. Septic infection of the subdural space, in our experience, is invariably fatal, and its prevention is therefore highly important.

CASE 6.—A man of 49 fell downstairs striking his head on a cement floor on Feb. 12, 1937. He was unconscious for twenty minutes, and on recovery complained of frontal headache and vomited. He was admitted to hospital next day. There was tenderness and œdema of the scalp over the left parieto-occipital region. The right knee-jerk was brisk and there was a questionable right extensor response.

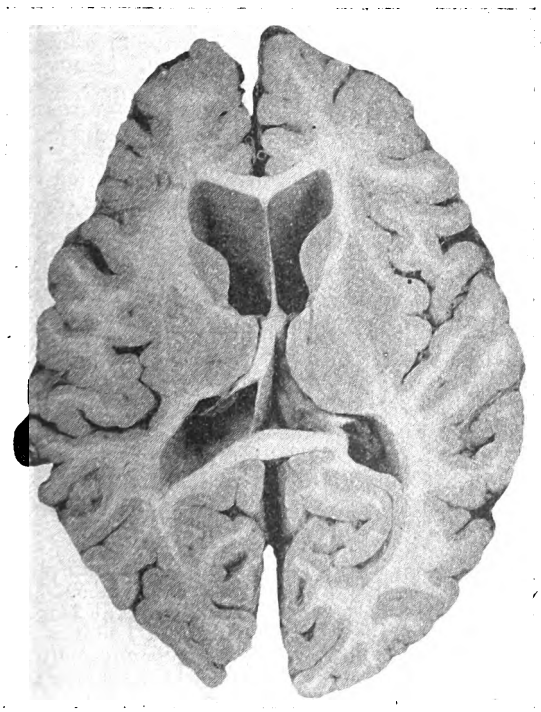

FIG. 3—Upper cut surface of horizontal section through cerebral hemispheres (case 3), showing frontal cortical compression, more evident on outer surface of right frontal lobe (left of photograph). Photograph also shows senile internal hydrocephalus of anterior horns of lateral ventricles, more marked on right side where cortical atrophy is greatest, and uniform senile arteriosclerosis of cortical vessels.

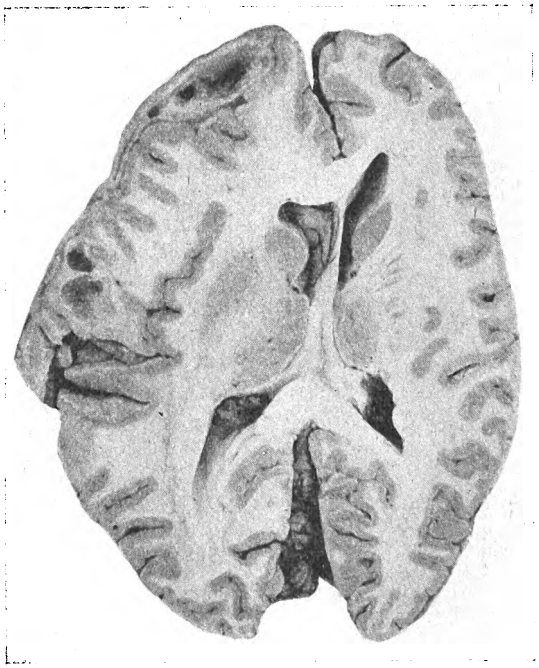

FIG. 4—Horizontal section through cerebral hemispheres of case 6, showing large subdural empyema caused by infection of chronic traumatic subdural hæmatoma compressing the cortex and white matter on lateral surface of left frontal lobe. Empyema has thick outer wall and somewhat thinner inner wall. Two abscess cavities in subcortical white matter of posterior part of left frontal lobe, probably caused by needle-puncture through infected subdural space. Anterior horn of left lateral ventricle has been compressed backwards and slightly to right. Photo also demonstrates difficulty of efficiently draining an infected subdural space.

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Radiography showed no fracture of the skull. His cerebrospinal fluid pressure was 400 mm. of water. Two days later he developed pain in the left ear. His temperature rose to 101° F. and 30 cells per c.mm. were found in the cerebrospinal fluid. A bulging, reddened tympanic membrane was noted on the left side on March 1. By March 11 he had a complete right hemiplegia with aphasia, and operation next day disclosed a subdural abscess mixed with broken-down blood over the left frontal lobe. Pneumococcus, type 3, was isolated from this material. He improved temporarily but again became stuporous, and in spite of a further exploration on April 3 he gradually went downhill, dying on April 24. Post-mortem examination revealed a linear fracture of the left side of the occipital bone running forwards into the petrous portion of the temporal bone. The latter bone contained soft, slightly purulent material, continuous with a chronic infection in the left middle ear cavity. A large infected subdural hæmatoma was found extending backwards for 11·5 cm. from the lateral side of the left frontal pole (fig. 4). In the anterior 4·5 cm. the membranes of the hæmatoma were separated by purulent exudate and in this region the cortex showed severe compression. Further back, where the infected hæmatoma had been drained by operation, its outer and inner walls were in contact. Two small subcortical abscesses found in the posterior part of the frontal lobe were possibly caused by needling of the brain through an infected subdural space.

HÆMATOMA WITH NO KNOWN TRAUMA

Reference has been made (case 3) to an important group of subdural hæmatomata in which there is no history of trauma. In view of the trivial nature of the trauma which typically produces this lesion it is likely that a mild unreported head-injury was the causative factor in most if not all of these cases, especially since no other satisfactory cause of massive subdural hæmatoma has yet been described. The absence of a history of head trauma does not rule out the presence of subdural hæmatoma and such absence may make its diagnosis extremely difficult; this is illustrated by the following case, one of three which came to autopsy within a few months.

CASE 7.—A man of 71 had had intermittent headaches for six months, during a fishing-trip in 1939. No history of head injury was elicited, in spite of careful questioning. One evening during the trip he complained of headache and drowsiness which forced him to lie down. On his way home on Sept. 10 he became very drowsy and his friends had to help him into the house. He had a meal, however, and went to bed and was up and around next day. He then collapsed with severe frontal headache and unsteadiness of the legs. This attack was followed by loss of memory, incoherent speech and inability to recognise his friends. He developed paralysis of the right arm shortly before his admission to hospital on Sept. 15. On admission no difference in the tone of the two upper limbs was noted. The abdominal reflexes were absent. Babinski's sign was present on both sides. The cranial nerves were normal and sensation was unimpaired. Next day all his limbs were flaccid, with absent reflexes in the legs. On Sept. 17 the left pupil was larger than the right and neither reacted to light. There was a flaccid quadriplegia, but reflexes were still obtainable in the arms. The cerebrospinal fluid showed a pressure of 50 mm. of water, with 50 cells per c.mm.; Pandy's test was weakly positive. He died on the following day with a clinical diagnosis of basilar thrombosis. Post-mortem examination revealed a large left subdural hæmatoma, thickest over the frontal lobe but extending backwards over the parietal and temporal lobes. The colour of the blood in the hæmatoma suggested that it was at least ten days old. There was severe herniation of the left hippocampal uncus, with stretching of the oculomotor nerve sufficient to account for the enlargement and fixity of the left pupil. The left cerebral hemisphere was severely compressed by the hæmatoma, with deviation of the midline structures to the right. This had caused the right cerebral peduncle to impinge against the sharp inner edge of the tentorium cerebelli (Kernohan 1929). Microscopically (figs. 5 and 6) there was acute traumatic necrosis, with hæmorrhage, in the area of the right pyramidal tract at the line of compression by the tentorium. These findings explain the presence of a flaccid quadriplegia for two days before his death. There was also a linear strip of hæmorrhage running through the pons at the junction of its upper and middle thirds.

FIG. 5—Right half of midbrain of case 7, under low power (× 4) stained with Mallory's phosphotungstic acid. Shows severe traumatic necrosis and hæmorrhage in right cerebral peduncle involving pyramidal-tract fibres. Red nucleus is seen lying mesial to peduncle; aqueduct is visible in upper part of photograph.

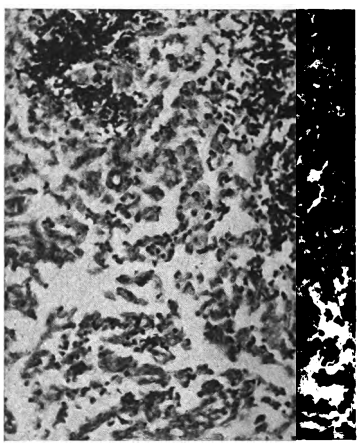

FIG. 6—Higher magnification (× 120) of fig. 5, showing severe traumatic necrosis and hæmorrhage in right cerebral peduncle.

This case illustrates how a subdural hæmatoma may rapidly produce, by its secondary pressure effects, a confusing clinical picture mimicking an acute pontine softening secondary to thrombosis of the basilar artery.

SUMMARY

The various symptoms and pathological changes produced by subdural hæmatoma, and the results of evacuation of the hæmatoma, are illustrated by examples from 54 cases. Chronic hæmatoma may follow a minor injury with no other serious intracranial damage and there may even be no history of trauma. It may lead to mental deterioration, beginning either soon or long after the hæmorrhage. Infection of a hæmatoma is rare, but may be commoner after war-wounds; it is almost invariably fatal.

I wish to thank members of the staff of the Toronto General Hospital and Dr. Arthur Elvidge for permission to report these cases.

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A CASE OF AXILLARY EMBOLECTOMY

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A MAN, aged 29, was admitted to Hammersmith Hospital on April 25, 1940. He said that he had had rheumatic fever at the age of 7 and again at 24; he had apparently made a good recovery and had no residual symptoms. He complained of cough and pain in the right side of his chest, associated with fever, for the past four days. He was restless, toxic and semi-delirious, with mobile alæ nasi. Temperature 104° F., respiration-rate 40, pulse-rate 120 and B.P. 140/60. The pulse was regular but dicrotic. The apex-beat was 4 in. from the midline in the fifth left intercostal space. There was a presystolic thrill and murmur at the apex, and a blowing diastolic murmur at the base conducted down the left

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border of the sternum. There was consolidation of the lower lobe of the right lung.

Next day he developed auricular fibrillation with a ventricular rate of 160 per min.; this was confirmed by an electrocardiogram. There was slight generalised venous engorgement, for which he was given 1 mg. of digoxin intravenously followed by two further injections, of 0·5 mg. each, at four-hourly intervals; this was followed by tab. digit. folia. gr. i, t.i.d. and sulphapyridine. By the fourth day the ventricular rate was 80 and the patient was afebrile. His heart was still fibrillating.

On the eighth day he complained that his right forearm, from 2 in. below the elbow-joint, had gone numb and that he had pins and needles in his finger-tips; just below the elbow he had the sensation of a constricting band; there was no pain but his fingers felt stiff. These symptoms had developed only five minutes before he was seen by one of us (J. F. H.). The colour of the limb was unchanged, but the fingers were abnormally cold and he was able to move them only with great difficulty. No pulsation could be felt in the radial, ulnar or brachial arteries. The axillary artery however was pulsating strongly, and this pulsation stopped at the level of the anterior axillary fold. A diagnosis was made of embolism at this site. The patient was kept warm in bed under observation. An hour and a half later the right forearm had become completely numb to the level of the elbow and the fingers could only just be moved. The hand was cool and the fingers pale, cold and cyanotic. Strong pulsations could be felt in the axillary artery and weaker pulsations in the brachial to just above the elbow, where all pulsation ceased. In view of these findings it was decided to perform embolectomy at once.

OPERATION

An incision was made under local anæsthesia over the lower part of the brachial artery, because it was thought that the embolus had moved on to the bifurcation of that artery. The artery was found to divide high up and the point of bifurcation was not seen. Both the radial and ulnar arteries were pulseless and contracted. As usual the ulnar artery was the larger; it was controlled by two loops of tape passed under it, and a small incision was made into the lumen. There was no bleeding and no clot in the proximal part of the artery, but a small clot was removed from the distal part. A ureteric catheter was then passed upwards towards the bifurcation of the brachial artery, in the hope of dislodging any clot impacted there, but none was obtained. Another incision was made, under local anæsthesia, over the upper part of the brachial artery. When the brachial artery was isolated the pulsation was found to be transmitted from the axillary artery. The brachial was now controlled in its turn by two loops of tape, and a small incision was made in it. It was found to be empty, but on milking the axillary artery downwards a clot about 6 cm. long was expressed, followed by a spurt of blood. There was no bleeding from the distal end of the artery. Bleeding was easily controlled and the incision in the artery was closed by a continuous silk suture. The colour of the hand had now improved considerably and the fingers were warmer. The incision in the ulnar artery which had been covered with packs of sodium citrate solution was then examined but no bleeding was taking place. A small nick was made in the radial artery and this bled freely; this and the incision in the ulnar artery were closed.

POSTOPERATIVE COURSE

Two hours after operation the hand was warm and pink and there was good circulatory return after compression of the nailbed. No pulsation could be felt in the radial artery at the wrist but paræsthesia had almost gone and power was returning to the fingers. Eleven hours after operation the radial pulse could just be felt at the wrist. All subjective symptoms in the hand and forearm had disappeared. There was still right basal lobar consolidation and the heart was fibrillating with a ventricular rate of 80. No further embolism occurred and on the fourth day after operation the heart returned to normal rhythm. The patient was discharged from hospital on May 30 by which time his lung had completely cleared, he had good cardiac reserve and a perfectly functioning arm in which all the arteries now pulsated, though the right radial pulse was still weaker than the left.

DISCUSSION

de Takats[1] says that "while embolectomies on the upper extremity are uniformly successful they are unnecessary, for one can get along without them," and this view is commonly held. Gangrene is admittedly an uncommon sequel to embolism of the upper extremity but it may occur. As de Takats remarks, there is a strong tendency to spontaneous recovery, but trophic changes have been described in the arm after embolism treated conservatively. The main reason why operation is urged by many surgeons is because secondary thrombosis beyond the embolus sets in after a few hours. In our case this had clearly taken place, since clot was removed from the distal part of the ulnar artery. It is probable also that clot was present in the upper part of the ulnar artery, but the radial artery was still patent.

In view of the large percentage of spontaneous recoveries in embolism of the upper extremity, conservative treatment should be tried, but if the limb fails to improve after four to six hours embolectomy should be performed. We operated in this case because of the poor general circulation at the time of the embolism and the progressive deterioration of the limb despite conservative treatment. Spontaneous recovery might have taken place later if vigorous vasodilating measures had been applied.

We wish to thank Dr. Allen Daley, medical officer of health to the L.C.C., and Sir Thomas Carey Evans, medical superintendent of Hammersmith Hospital, for permission to publish this case.

BRUCELLA MELITENSIS IN COW'S MILK

By F. W. Duke

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Whereas examples of *Brucella abortus* in cow's milk are common, *Br. melitensis* has not so far as I am aware been found in cow's milk in this country before it was isolated in this laboratory. The distinctions between the types are of more than academic interest, since it is generally agreed that the melitensis strain is far more virulent to human beings than the abortus strain.

Since the practice was introduced by Dr. John Menton in January, 1937, all milk sent to this laboratory for testing for tuberculosis has at the same time been tested for brucellosis of the three types. Provision is made for the detection of *Br. melitensis* and *Br. suis* as well as *Br. abortus*. This practice has been continued, although all strains isolated had hitherto proved to be *Br. abortus*. When therefore a culture of brucella was obtained aerobically inquiries were at once made, since *Br. abortus* requires 10% carbon dioxide for primary culture.

The milk was a bulk sample from an accredited herd of seventy-six cows. At no time during the last 14 years had there been any goats on the farm. A guineapig was killed 44 days after inoculation with the sediment; its serum was positive to the agglutination and precipitin reactions for brucella. The organism recovered from the bone-marrow and the spleen grew well aerobically in primary culture in 7 days on liver-extract agar; no H_2S was produced. Luxuriant growth occurred, aerobically, on the dye media, thionin, fuchsin, methyl violet and pyronin. The organism was agglutinated by a monospecific melitensis serum, but not by a monospecific abortus serum. The organism proved to be virulent to the guineapig, killing two, in 29 and 64 days respectively. Single samples of milk were obtained from individual cows still available in this herd. Three cows provided samples from which *Br. melitensis* was recovered, judged by the criteria already detailed. The guineapigs were injected by Dr. A. J. McCall.

This work was begun under the direction of Dr. John Menton, who died before its completion.

I wish to thank Dr. W. D. Carruthers, medical officer of health for Staffordshire, and Dr. J. L. Edwards, senior assistant bacteriologist and pathologist to the County Laboratory, Stafford, for permission and encouragement to publish this work.

1. de Takats, G. *J. Amer. med. Ass.* 1938 **110**, 1075.

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DETECTION OF TUBERCULOSIS AMONG RECRUITS

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The controversy concerning miniature screen photography of the chest has not yet resulted in the application of this (or any other) method of mass radiography to the examination of recruits for the armed forces, but it has advertised the fact that among men of military age who consider themselves healthy, or in whom at all events the presence of pulmonary tuberculosis is not suspected, radiological investigation (followed by the necessary supplementary examinations) will detect active tuberculous lesions in from 0·5 to 2% or more. At present the only procedure by which it might be hoped to discover at least some of these men is that which allows medical boards to refer selected recruits to the local tuberculosis officer for an opinion.

As far as I know, no precise guiding rules have been issued to tuberculosis officers, either on the investigations they should carry out or on the criteria to be adopted in assessing fitness for the Services as far as the chest is concerned. Is the tuberculosis officer, for instance, obliged to carry out an X-ray examination in each case? Only a small proportion of tuberculosis dispensaries have an X-ray apparatus on the premises, and in many instances the patient is sent to a hospital and reliance is placed on a report from a radiologist often without special experience in chest radiography. Is the tuberculosis officer to report merely on whether or not a tuberculous lesion is present, or is he also to express an opinion on non-tuberculous conditions? If the latter he will need to possess a wide experience of chest disease in general and have at hand facilities for carrying out special investigations, such as bronchography and bronchoscopy.

The men referred to me can be classified into two groups. The first group comprises those who are, or who recently have been, under supervision at the dispensary for active, quiescent or arrested tuberculous disease. This information is presumably given by the recruit, and the medical board ask for a confirmatory report. This group, consisting of 30 men, need not be discussed further. The second group consists of men whom the medical boards presumably suspect of suffering from tuberculosis or some other condition of the chest. In the past few months 134 men were referred to me for the following reasons.

Reason for reference.	*Number referred.*
History of "pleurisy"	40*
History of "tuberculosis in family"	37†
History of stay in sanatorium or attendance at dispensary many years before	13‡
History of "pneumonia"	7§
History of empyema	2
History of spontaneous pneumothorax	2‖
History of rectal operations	2
Presence of symptoms	15
Presence of abnormal physical signs	4
Reason not stated and not apparent	12
Total	134

* In 6 instances also "tuberculosis in family," and in 1 instance also abnormal physical signs.
† In 1 instance also "tuberculosis in family," and in 1 instance also a history of "pneumonia."
‡ In 1 instance also "tuberculosis in family."
§ In 1 instance also history of spontaneous pneumothorax.
‖ In 1 instance also "tuberculosis in family."

The following procedure is adopted in my clinic in investigating recruits.

1. Both in regard to "tuberculosis in the family" and a history of "pleurisy," "pneumonia," and so on an endeavour is made in each case to assess how true the history is by appropriate questioning (e.g., whether the alleged consumptive relative had been to a sanatorium), and, when the man had been admitted to a hospital, by obtaining a report from that institution.

2. A radiogram is taken or X-ray screening is carried out after the physical examination in every case. If screening shows the slightest abnormality a radiogram is taken. This is also done when screening shows no abnormality but suspicious symptoms or physical signs are present. When symptoms or signs are present lateral films are also taken if the anteroposterior films show no abnormality. When the history, physical examination or radiograms suggest bronchiectasis or bronchial obstruction bronchograms are taken.

3. Sputum when available is examined for tubercle bacilli in every case irrespective of any other consideration.

4. In all recruits showing tuberculous foci (except an obvious calcified primary complex) radiograms are repeated after one or more intervals and sedimentation tests are carried out.

* The views expressed in this paper are those of the author, and do not necessarily represent those of the Middlesex county council.

DIAGNOSTIC FINDINGS

These were the findings among the 134 recruits.

Diagnosis.	*Number of recruits*
Bronchitis	16*
Emphysema	3
Bronchial asthma (treated for some years; recently produced positive sputum, but no other evidence whatever of active pulmonary tuberculosis found)	1
Sacular bronchiectasis	2
Silicosis	1
Congenital cystic disease of lung, with pleural involvement	1
Mitral stenosis, pulmonary congestion and fibrinous bronchitis	1
Localised collapse areas following influenzal bronchopneumonia	1
Congenital heart disease (opinion of cardiologist advised)	1
Pleural changes (from obvious pleural thickening with displacement of heart to filling of costophrenic angle)	19
History of pleural effusion in hospital	7
History of "pleurisy" at home	3
History of empyema (probably "necessitatis" in 1 instance)	4
History of "pneumonia"	2
History of probable effusion	1
History of "arthritis of all joints"	1
No history of illness	1
Tuberculous changes in the lungs	13
Total	58

* In 4 instances it was probably associated with infection of the upper respiratory tract; in 1 instance there were also arrested tuberculous lesions—this case is included below.

CASES SHOWING TUBERCULOUS CHANGES IN LUNGS

Case 1.—Healed lesions (fibrosis and calcification) with presumably recent exacerbation. Admitted to sanatorium where a laryngeal swab found positive.
Referred because he "had been under observation twelve years before for ? tuberculous glands."

Case 2.—Bilateral advanced phthisis. Died in hospital two months later. This man had been seen by his doctor several times who believed him to be suffering from bronchitis.
Referred because of symptoms and physical signs.

Case 3.—Slight fibrotic shadows at both apices (remains of a postprimary dissemination—"Simon foci").
Referred because of a history of "pleurisy" at home.

Case 4.—Calcified foci in upper half of one lung field. No history of illness. Reason for being referred not stated.

Case 5.—Calcified focus in midzone (probably "round focus"). No history of illness.
Referred because of "tuberculosis in family."

Case 6.—Scattered calcified nodules in both lungs. Man stated that he had been to a sanatorium in Switzerland seven years before. Referred because of this statement.

Case 7.—Small infraclavicular shadow. Three monthly radiograms and sedimentation-rate tests, and absence of symptoms, appeared to show that lesion was not active, but it had not been present on a film taken elsewhere eighteen months before.
Referred because of "tuberculosis in family."

Case 8.—Linear and nodular shadows at both apices suggesting fibrosis. Lesions not active. Had been in a sanatorium nine years before. Referred because of this history.

Case 9.—Linear shadows at one apex, and trachea displaced to same side. Lesions not active. No history of illness.
Referred because of "tuberculosis in family."

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CASE 10.—Linear shadows in each upper zone. Lesions not active. History of "pneumonia" at age of ten, after which he was sent to a sanatorium for several months. In sanatorium again for several months at sixteen. Quite well since. Referred because of this history.

CASE 11.—A few nodular shadows in one upper zone. Lesions not active. Was diagnosed as suffering from pulmonary tuberculosis ten years before and considered "recovered" in 1935. Referred because of this history.

CASE 12.—Calcified foci and fibrosis in each upper zone. Lesions not active. No history of illness.
Referred because of "?? P.S. at apex."

CASE 13.—Scattered calcified foci in one lower zone. Diagnosed as suffering from pulmonary tuberculosis in 1929 and considered "recovered" in 1934.
Referred because of that history.

To summarise, there were discovered:
Two cases of active phthisis (cases 1 and 2). Referred: one because of ? tuberculosis in childhood; one because of symptoms and signs.
One case of "quiescent" early lesion (case 7). Referred because of "tuberculosis in family."
Two cases of remains of postprimary dissemination (cases 3 and 5). Referred: one because of history of "pleurisy," unconfirmed; one because of "tuberculosis in family."
Five cases of healed phthisis with a history of treatment (cases 6, 8, 10, 11 and 13). All referred because of that history.
Three cases of healed phthisis without a history of treatment or illness (cases 4, 9 and 12). Referred: one because of reason unknown; one because of "tuberculosis in family"; one because of ? abnormal physical signs.

DISCUSSION

It appears that the main criteria adopted by the medical boards in selecting those who might be suffering from active or latent pulmonary tuberculosis were (1) a statement of "tuberculosis in the family"; (2) a statement of "pleurisy" in the past; and (3) a statement that the man had in childhood or adolescence been in a sanatorium or attended a tuberculosis clinic. The findings in the lungs in these cases show that by itself neither a history of "tuberculosis in the family" as usually obtained, confirmation being often impracticable without time-consuming inquiries, nor a history of "pleurisy" without definite evidence that the alleged illness really was a pleurisy is a fruitful criterion for discovering either active or arrested pulmonary tuberculosis.

What little rôle is played by such a family history may also be gathered from the fact that among 44 recruits with a history of tuberculosis in the family tuberculous pulmonary or pleural changes were found in 5, whereas among 90 recruits who gave no such history tuberculous pulmonary or pleural changes were found in 21 (pleural changes that could be attributed to an empyema or definite pneumonia are not included in these figures).

That little reliance can be placed on a man's statement that he has suffered from pleurisy, unless he had been admitted to hospital, is shown by the fact that among 9 recruits who had been admitted to hospital radiographic changes of pleural involvement were found in 7, whereas among 20 recruits who remained at home, but were told by their doctors that they had pleurisy, such changes were found in 4 only (pleural involvement was also found in 1 man who gave no history of illness, and in 1 man who said he had "arthritis of all the joints" eighteen months previously).

The next step is to compare the actual findings in regard to pulmonary tuberculosis with the expected findings based on results already published of radiological examination of similar "populations." Unfortunately there are no such figures for unsuspected tuberculosis among recruits in this country. Relying only on radiograms taken with a portable apparatus, Wingfield and Macpherson[1] found among over 2000 cases, adolescents between the ages of fourteen and twenty-one, drawn from an urban and semi-urban working-class population, "a definite incidence" of 0·65%, and "a possible incidence" of 1·08% of tuberculous lesions "of the adult type." (It is not known what proportion of these were active at the time of examination.) Hart, Hilton and Morland[2] found at University College Hospital that 26 (6·2%) of 417 students (aged mainly between twenty and twenty-five) showed "lesions considered of importance." Of these 26 cases, 9 (2% of the total number examined) had active or probably active tuberculous pulmonary or pleural lesions which were discovered *solely as the result of routine radiological examination.* In papers published from many other countries giving results of mass radiological examinations in adults (students, nurses, industrial employees, recruits), the incidence of active pulmonary tuberculosis *previously unsuspected* varies from 0·5 to 4%. Recently figures were published by Cooper[3] relating to recruits in Australia; active lesions were found in 0·55%.

In estimating the number of cases with active pulmonary lesions expected in any population of recruits one would obviously need to take into account the incidence of tuberculosis in the community from which the recruits originate, and also the efficiency of the tuberculosis scheme in that district. Where the scheme is efficiently organised fewer early cases are likely to be missed before they are seen by the medical boards, as the result of contact examinations, coöperation between general practitioners and tuberculosis officers, "training" of local practitioners by the tuberculosis officer, and so on. I understand that roughly 1–2% of the recruits that come before the medical boards are referred to tuberculosis officers, so that the total number of recruits from which those referred to me were selected was at least 7000. Even on the basis of 0·5% of unsuspected tuberculosis—the lowest figure among results published—we might expect 35 cases of active lesions among the 7000 recruits. Only 2 men with active disease, including 1 with very advanced disease that should have been diagnosed by his own doctor long before, and 1 with recently active disease were discovered in the men referred to me, so that from one batch of recruits no less than 33 men with active lesions were presumably admitted into the Services, and this figure might well be three or four times as high. Due allowance must be made for the possibility that some of these cases were rejected by the medical boards for other reasons; but in view of the small percentages of total rejections published this number is not likely to be significant, and up to the present I have not seen a single patient with phthisis at my clinic since the war began who had been rejected by the medical boards.[4]

CONCLUSIONS

These findings appear to confirm the view that without routine radiological examination the detection of unsuspected tuberculosis in recruits is impossible, and that the criteria used in selecting recruits for radiological examination, particularly "tuberculosis in the family" and "pleurisy" in the past, as these histories are given by the recruit, cannot be relied on to detect more than a small fraction of recruits with either active or healed pulmonary lesions.

I recognise that the number of recruits investigated is too small to permit of formal conclusions, but this note may stimulate others to publish their findings so that sufficient material may be collected for an inquiry into the criteria at present used for choosing the men referred to tuberculosis officers, and into whether criteria do in fact exist which would enable the medical boards to select a large proportion of unsuspected bearers of active tuberculous lesions.

Publication of the incidence of tuberculosis among recruits as discovered by the present method of referring selected recruits to tuberculosis officers would be of great practical interest, and might serve as a potent stimulus to the adoption of routine radiological examination for all recruits.

1. *Brit. med. J.* 1936, 1, 741.
2. *Lancet*, 1940, 1, 263.
3. *Brit. med. J.*, 1940, 2, 245.
4. Since the above was written I have seen a patient at my clinic with very extensive bilateral phthisis and tuberculous laryngitis (he had been hoarse for eight months) who was rejected by the medical board and told to see me (no confirmatory report was apparently considered necessary). He had had a hæmoptysis in 1936, when his doctor had not referred him to the tuberculosis dispensary and had not himself carried out any investigations for tuberculosis. The patient had also attended the same doctor several times for cough, sputum and hoarseness during a period of three months until about four months before seeing me again without being referred to the tuberculosis dispensary or having his chest X rayed or sputum examined.

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Reviews of Books

Field Surgery in Total War

By DOUGLAS W. JOLLY, M.B. N.Z., late major, Spanish Republican Army Medical Service. London: Hamish Hamilton, Medical Books. Pp. 236. 10*s.* 6*d.*

COUNTLESS books were written on the surgery of the great war, many about the Spanish war, and not a few have already appeared about the present one. This is as good as the best of them, and exactly suited to the needs of the front-line surgeon. Dr. Jolly's views are based on his work with the Republican Army in Spain, and though both the scale and the duration of the Spanish civil war were less than those of the last European conflagration the fighting was more continuous and more localised, and the experience of the front-line surgeons correspondingly greater. He has the eye to observe and the industry to record all he sees, the ability to reduce his observations and records to clear principles and simple instructions, and an uncommon talent for stating his conclusions briefly and attractively. The first part of his book deals with the disposition of advanced operating hospitals in a war dominated by aerial attack; the second and larger part concerns surgical technique. His instructions on the management of wounds of the head and spine, of the eye and the thorax are particularly valuable. These are injuries in which intelligent management by advanced surgical units at times of stress is of the utmost importance; on that depends the benefit they will derive from the surgery of the specialised hospitals to which they will be drafted at the earliest opportunity. Throughout Dr. Jolly writes with shrewd judgment and a sane practical outlook, and in a lucid and occasionally epigrammatic style. The book should be read at once by every young surgeon who may be called on to treat war casualties, and by every consultant who is still uncertain how far his memories of the last war fit into the actualities of this one.

Diseases of the Esophagus

Diagnosis and Treatment. By PORTER P. VINSON, M.D., D.Sc., F.A.C.P., professor of bronchoscopy, esophagoscopy and gastroscopy, Medical College of Virginia. London: Baillière, Tindall and Cox. Pp. 224. 22*s.*

Professor Vinson is a disciple of the late Dr. Henry S. Plummer, to whose memory he dedicates his book. The string method, associated with the names of Plummer and Vinson, is the central theme round which all forms of treatment of diseases of the œsophagus are grouped, and is described fully. Few details are given of the surgical methods used from time to time, or their results. The string method consists in dilatation of the lumen at the level of the growth by means of bougies passed over a previously swallowed silk thread. He states that more than 90% of his patients are benefited by this treatment, and suggests that if all patients complaining of dysphagia were instructed to swallow a thread at an early stage, gastrostomy would never be required. No details are given about the management of those cases in which it has been impossible to negotiate the stenosis with bougies, though he draws attention to the miserable condition of patients with complete obliteration of the œsophagus and emphasises their willingness to undergo any operation likely to improve their condition. He damns direct surgical intervention with less than faint praise, however, and is almost as pessimistic about radiotherapy and roentgenotherapy; nor is he in favour of gastrostomy, in which his experiences must have been unfortunate because he quotes the mortality as ranging from 10 to 50%. It is curious to English readers to find him referring to the expense of the operation as one of its contra-indications. He stresses the dangers of œsophagoscopy and indicates the many conditions in which it can be dispensed with. Among a series of unusual tumours of the œsophagus he mentions varices and recommends ligation of the larger veins passing up to the œsophagus from the cardiac end of the stomach; but says nothing of the results of this intervention. He points out that a foreign body which has passed from the œsophagus into the stomach may be vomited back, and quotes the case of a safety-pin which lodged with point upwards about the middle of the œsophagus; it was pushed into the stomach at an œsophagoscopic examination and later regurgitated into the upper œsophagus, this time with the blunt end upwards, so that it was easily and safely removed at a second œsophagoscopic examination. From this he argues that it is sometimes better to push a sharp-pointed foreign body into the stomach than to attempt its uncertain removal by the retrograde route.

Though most concerned with the practical side of the subject the book deals shortly with all the pathological charges likely to be met with. There is a full bibliography at the end of each chapter and the illustrations, more particularly the radiograms and diagrams, are clear and well chosen.

Diseases of the Nervous System

By F. M. R. WALSHE, M.D., D.Sc. Lond., F.R.C.P., physician in charge of the neurological department, University College Hospital; and physician to the National Hospital, Queen Square. Edinburgh: E. & S. Livingstone. Pp. 288. 12*s.* 6*d.*

THIS textbook makes the subject of neurology vital and interesting to the general practitioner, for whom it is chiefly intended. The author has maintained in his preface that "the writing of a simple textbook adapted to the needs of the student and practitioner has been the avowed aim of more authors than have achieved it"; and he then defends his omissions and simplifications. The defence is not needed; intended readers will not grumble because the dispute surrounding the spared macula has been passed over in a few words, and the academic sub-groups of the gliomas reduced to two types depending on their rate of invasion. On the contrary, much of the simplification, designed for lucid teaching, has led to a masterly synthesis of material superficially unconnected or incongruous. Thus his description of the symptomatology of cerebellar lesions brings scattered observations into line, and the diverse signs of incoördination have an ordered relationship to each other. It is delightful to read a book where signs and syndromes do not live as separate entities, under cover of classical neologisms or the names of defunct neurologists, but play active parts in the evolution of a descriptive narrative. The symptoms arising from damage to various units of the nervous system—such as the upper and lower motor neurones—are first described and then are remodelled into descriptions of different disease groups. Organised neurophysiology and anatomy have been displaced by such subjects as the symptomatology of the sphincters or of speech, and the story is told in a language which the practitioner will enjoy. In the description of diseases the common conditions, such as epilepsy, vascular diseases, and syphilitic infection have been dealt with carefully and rare and unimportant syndromes excluded. Dr. Walshe is dogmatic, for which he could be criticised by the expert, but he has used his dogmatism so skilfully that it is likely to do more good than harm. The uncompromising view that all traumatic neuroses are motivated by gain, however, will find many dissentients, and might give the general practitioner a cynical outlook in handling a difficult and delicate subject.

Protozoology

(2nd ed.) By RICHARD ROKSABRO KUDO, D.Sc. London: Baillière, Tindall and Cox. Pp. 689. 36*s.*

IN this textbook, a revised and enlarged edition of the author's "Handbook of Protozoology" published in 1931, Professor Kudo of Illinois describes the representative forms of both free-living and parasitic protozoa. The first part of the book deals with morphology, reproduction, physiology, bionomics and genetics. The second part, 37 chapters in all, is taken up by a systematic account of the various subdivisions. Convenient dichotomous keys gradually lead from accounts of the major groups to those of families, which contain short illustrated descriptions of selected genera and species. The book provides an authoritative guide to the study of protozoa for the general zoologist, but does not give any special prominence to the parasitic protozoa of man, which are disposed of in about half a dozen pages; it therefore will not satisfy the needs of the medical man. It will serve, however, as a useful supplement to the more practical publications in medical protozoology, since it gives an insight into problems and data connected both with parasitic and free-living protozoa with which the medical reader is less familiar.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE "season of mists and mellow fruitfulness" is marked by the invasion of our wards by hordes of new students. Every year they seem to be younger and more boyish—or girlish, but that may be because I am getting a bit thin on top. I always found the beginning of term a rather grim business. The application of one's nose, already tending to the Churchillian pattern, to the academic grindstone at times to suit the convenience of others always made me sigh for the free-lance opportunities afforded by the vacation.

Perhaps it was with this in mind that the authorities of this Scottish university arranged that our first week of study should be enlivened by a lecture on fire-fighting. If so they must feel that the experiment succeeded beyond their wildest dreams. The audience consisted of about 150 souls, most of them members of the teaching staff and representing all faculties. Not a few of them were members of the senate; and if we adopt the phraseology dear to the popular writers on astronomy we might say that if their academic qualifications were to be placed end to end they would stretch a considerable distance. Our lecturer was an honest fellow but clearly unaccustomed to handling an audience such as this; and as he looked up at the rows of inquiring faces he was observed to break out into a gentle sweat. No doubt he realised in that moment that he was committed to a task beyond him, but he attacked it with native courage. . . . For a moment or two he seemed to waver, but presently he plunged into his discourse in full oratorical style, embellished by a patois that only becomes intelligible after living many years north of the Border. He declared "with some 'eat," as Stanley Holloway might say, that it was not his intention to turn us into firemen; that, he added, amid loud laughter, was impossible. Nevertheless, he gave us a comprehensive account of the pathogenesis of what he called "that terrible thing, that scourge—FIRE."

Not unnaturally, he showed a complete inability to adapt his lecture to the limited requirements of a group of people needing instruction on how to deal with an incendiary bomb; and so he spent the first three-quarters of an hour in dealing exhaustively with the menace of the cigarette-end, the electric smoothing iron, short-circuits in domestic premises and kindred subjects, all of which were richly annotated with personal experiences. Page after page of the notes were turned over; he had set his hand to the plough, and there was no looking back.

After treading figuratively but none the less heavily on the toes of the professor of divinity he turned blithely to illuminate his subject by drawing a comparison between fire-fighting and first-aid. This necessitated a discourse on the practice of surgery, and after the regius professor in this subject had endured it with his head in his hands for upwards of ten minutes he rose with a fixed expression on his face and made his departure. The climax was reached after 1½ hours, when the lecturer, turning to the subject of the fireman's lift, called down a student whose weight was probably in the neighbourhood of 14 stone. Casting his eye over the audience, and ignoring completely a large batch of Fellows of the Royal Society, he summoned an erudite but frail lady, a scientist, to perform the herculean task of shifting this mountain of flesh which had now been deposited on the demonstration table in the well of the theatre. Such was his strength of character that he prevailed upon the lady to crawl along the bench trying, without any visible result excepting a considerable loss of dignity, to drag the prostrate form away from an imaginary fire.

Unveraciously though I have reported it, the lecture had great merit as a variety turn.

* * *

Living in London now is a curiously unreal experience. During the day the recurrent wail of the sirens, the occasional noise of anti-aircraft gun-fire and the constant reminder every few hundred yards or so that these sounds are significant still fail to impress most of us with any sense of living in stirring times. It must be a fact that history is being made under our very noses, and indeed that we are playing some part in the process, but the imagination does not grasp the situation vitally enough to heighten our senses to awareness. Perhaps this is just as well. It would be intolerable to witness in others a theatrical assumption of a share in destiny and probably rather uncomfortable to play the rôle oneself. However, we have now discarded the weather and adopted the bomb as our conversational stand-by. Everybody has his story of his own pet bomb which was so much more peculiarly harmless or devastating than anyone else's. Powers of description and the general standard of eloquence are rising rapidly, and even the most terse narrator is finding it difficult to tell his story without interruption. If a few weeks of the blitzkrieg has so loosened the tongue of the proverbially silent Englishman what are a few months going to do?

Underlying the cheerful exchanges of the daytime is always a slight chill anticipation of the night. On a cloudy day when the airman's visibility resembles that of night we walk the streets and carry on with our jobs almost regardless, and often forgetful, of the alerts and all-clears. But at the approach of dusk the tempo quickens and conversations quickly break up as the homing instinct becomes dominant; and by blackout the streets are deserted. In our homes or shelters darkness completely alters our attitude—the warning and almost simultaneous hum of the raiders are perceived with a stark and sturdy clarity. We are for it and we know it and are quite definite about our determination to stick it out. This contrasting spirit of acceptance of what are apparently similar circumstances is probably an unconscious tribute to our youthful air fighters. We are sublimely sure that the "boys" will find 'em and beat 'em up in daylight however unfavourable the conditions and odds and we don't bother about it any more. But at night there is the primitive fear engendered by darkness, and we feel that the Nazis can at the moment indulge in their major amusement, the infliction of hurt, with little risk to themselves. And we feel resentful, rather disgusted and somewhat cheap at being the objects of such bestial indulgence and at our temporary impotence to prevent it. Presumably this is why there is so little call for reprisals although there is an intensifying desire for vengeance and punishment. For this mass exhibition of sadism arouses in us all, even those with the most highly developed social conscience, emotions of which we would otherwise be ashamed. It is difficult at all times to dispel an emotion by reason, and in this case the recurrent provocation makes it still more difficult. Thoughts endured during the night often disappear with the light of day, but there is now too much visual evidence with which to reinforce these nocturnal ponderings All the same, we shall have to get these mental conflicts into their proper perspective if we are going to discount them when the time comes for a final settlement.

* * *

Sometimes between my waking and my shave I feel the coursing of that dread alkaloid disillusionine. Formed from alcoholic esters by celibacy and autointoxication its action is to draw all kindly screens aside and give a corpselike clarity of view. My cabin becomes a dirty box, eight feet square, badly ventilated. Around me in similar dirty boxes are my shipmates, whose faces I loathe and whose habits I abhor. Some of the more revolting and despicable of these individuals I have to call "Sir." This war business is a reversion to a thirteen-year-old state of affairs and we are all kids again. That is why they dress sailors up in Jean collars, decoratively like children. Incidentally all uniforms are forms of atavism. The Scotch kilt has a perfect homologue in the coloured behinds of the apes; it exerts the same attraction for the opposite sex and has much the same sort of colour scheme. I must remember to tell McSporran that at breakfast—it will annoy him.

If I am allowed to open my scuttle I shall look out on the grey waters of a famous naval harbour, probably one of the safest places in the country, while a few hundred miles away in London women and children are in the front line by day, in dug-outs by night. Some idiots marvel at the cockney courage, yet everybody knows they made the best trench-warfare soldiers; they are inured to murk and noise and miserable conditions as well as the sense of catastrophe ahead, and for generations the struggle for existence has been keener in London than anywhere. Besides, the cockney has a sort of natural taste for horrors. I remember watching the eyes

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of some Southwark scouts around a camp fire when one of their number was singing with evident relish, "Red stain on the carpet, red stain on the knife, O Dr. Buck Ruxton, you've murdered your wife" and about twenty more verses. Camp in August, 1939; it seems a century away.

* * *

Living on the south-east coast these days entails interesting ocular and unpleasant auditory impressions, and even periods of cave-dwelling; but all become matters of custom. Everyone, or nearly everyone, adopts willy-nilly something of a fatalistic response and as the blitzkrieg goes on it worries us less and less. Bombs fall on golf-courses, cricket-grounds and gardens, but as yet elderly doctors have their bowling-greens undamaged; there has been considerable damage to property, but few human casualties in the many raids—with one exception. One afternoon a solitary raider dropped a row of bombs which fell on a cinema during a special children's matinée and on streets of small houses over a hundred years old. The cinema was wrecked, many houses were demolished, there was much damage to life and limb. The resources of a nearby hospital and first-aid post were strained to their utmost owing to the number and the concentration of the casualties. The operating-theatres were in full swing for twelve hours, and, after a break of four hours, for a second shift of eleven hours, 72 operations being performed in that time. Among these casualties, running well into three figures, there was one solitary member of the fighting forces: all the remainder were civilians, many of them children. The exception was an aircraftsman, home on four days leave, who had just sat down in the cinema when that bomb exploded.

I had ample opportunity to observe the reaction, immediate and delayed, of the victims of this startling experience. In the cinema there was no panic. Many parents were there with their children and were together or adjacent to each other in the hospital later. In first-aid post, theatres and wards the fortitude of these stricken folk had to be seen to be believed. One woman of 69 lying on a stretcher was insistent that every child must be attended to before she took her turn. She was found to have a compound comminuted fracture of the femur. Another elderly woman who had one eye destroyed and multiple injuries apologised to the ward sister because she had been sick before a bowl could be brought to her. From not one of them was heard a complaint or seen a tear. Most remarkable of all, there were no bitter words, no recrimination. With all this talk of reprisals no thought of revenge appeared to enter their minds. Soon the wards were full of smiling faces, some bandaged but all cheerful. Children proudly exhibited foreign bodies removed from various portions of their anatomy, designating all of them shrapnel. No longer playing at soldiers, they were now real wounded soldiers. There appeared to be no delayed shock; one and all took their injuries as part of the day's work, part of what their country was going through.

Even this painful episode was not without its lighter side. One frantic mother implored the hospital to find her two small sons. They had gone to the cinema, of that she was certain, but there was no trace of them in the hospital or elsewhere. Some hours later they came home safe and sound. Yes, their cinema had been bombed so they had gone on to another one. An elderly man with badly smashed tibia and fibula seemed less concerned about them than about the loss of an overcoat of well-known make; it was not found in the debris of the cinema, but a line from the hospital to the makers produced a new coat along with a generous expression of hope for his speedy recovery. A young woman lost her home; with it, we heard, had gone a favourite nail-file.

* * *

He was sent to us as a case of neurosis, a surly and disgruntled fellow who refused to look you in the face. He had a fine physique but chose to lie curled up in bed until the medical officer had finished his round—he was active enough when the visit was over. It was difficult to make him talk, but at last he responded. "What was your job in civil life?" "Inspector of milestones, sir." I hadn't realised that there was such an occupation, and said so. "Tramp to most people, sir!" Have neurotics a sense of humour? Or was the joke on the diagnostician?

HEALTH INSURANCE IN THE UNITED STATES

REPLY TO A BRITISH RESIDENT[1] BY AN AMERICAN MEDICAL ECONOMIST

THERE is a tendency, which is common to advocates of compulsory sickness insurance in the United States, to give exaggerated credence to the reports of the Committee on the Costs of Medical Care. The opposition of the American Medical Association to compulsory health insurance has not been based on such generalities as calling it "state medicine," or such minor points as that it might give rise to "graft," or even because practitioners are "kept busy filling in forms." Such criticisms could doubtless be found, but the basic opposition was founded on the most thorough study of the medical side of European sickness insurance that has been undertaken by anyone in the United States and certainly a more thorough study than was made by any of the advocates of such insurance. Some of the arguments offered against it were that it had failed to reduce morbidity and mortality as fast as these had been reduced in the United States and in other countries not having such systems of sickness insurance, such as Australia, New Zealand and Canada. The published statements by physicians in countries having sickness insurance concerning the effects of such systems in lowering the quality and quantity of medical care were also quoted. No statement of the American Medical Association has ever implied that there was not "free choice of physicians in the British system," or that any system of sickness insurance was bankrupt. On the latter point, it has been pointed out repeatedly that such insurance systems cannot go bankrupt because the flexible element which can always be adjusted to fit income is the quality and quantity of the medical service.

The Wagner Health Bill was not opposed because it provided federal subsidies for local health services. On the contrary, the state and county medical societies have been the principal advocates of the establishment of public-health services and have coöperated with these in their legitimate field of protection to the public health. Such public-health departments have been criticised only when they have sought to enter the field of private practice. The advances of public health in diphtheria immunisation are very largely due to the active coöperation and the initiative of county medical societies, which are the component units of the American Medical Association. Neither is it by any means true that graft and political influences have not greatly interfered with the efficiency of American public-health administration. There are few city health departments of long standing that have not at some time in their history had political scandals which have called for strong protests on the part of organised medicine. It is no exaggeration to say that whatever freedom from harmful political influence exists is due largely to the watchfulness and activity of organised medicine. The opposition to the Wagner Health Bill, so far as it was related to health insurance, was because of a rather tricky provision in the bill which, without mentioning insurance, was apparently designed to introduce it surreptitiously. Incidentally, the bill was not defeated but is still on the Congressional calendar, but apparently has been abandoned by its former advocates largely, it is believed, because of the arguments offered by the American Medical Association. Furthermore, the association has offered a programme regarding medical service and health protection which seems to be gaining favour and some of which has already been enacted into law.

While it is true that voluntary health insurance does not "solve the problem of providing medical attention for the poorer members of the community," it is equally true that compulsory health insurance in no country covers the indigent but only the wage-earners. On the other hand, the state and county medical societies in the United States have been the foremost agency in organising, in coöperation with the relief authorities and often at great financial sacrifice to the physicians concerned, the extensive plans in existence for "providing medical attention for the poorer members of the community."

1. *Lancet*, 1940, 2, 207.

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THE LANCET

LONDON: SATURDAY, OCTOBER 26, 1940

SUPERIORITY OF WHOLEMEAL

THE inferiority of white flour in vitamin-B_1 content is generally accepted, but its inferiority in other respects, particularly in its content of vitamins of the B_2 complex, is not so widely conceded. In an experiment described on another page Dr. HARRIETTE CHICK has demonstrated this inferiority so clearly and simply that no-one can gainsay it. Dr. CHICK has fed groups of rats on white flour (73% extraction) and wholemeal (100% extraction) derived from the same grist. All the rats received diets between eight and nine tenths of which was made up of one or other of these two flours, the rest of the diet consisting of added protein, minerals and fat-soluble vitamins. Vitamin B_1 was added to the white-flour diet so that the rats received 3 international units per head daily; this is an optimum dose of vitamin B_1 for a rat, so that any inferiority which might be shown by the rats receiving white flour could not be attributed to lack of vitamin B_1. The rats receiving the wholemeal derived from it their vitamin B_1 and any other vitamins of the B_2 complex which might be present; any superiority which they might show over the rats receiving the white flour must be attributed to their greater intake of vitamins of the B_2 complex or possibly to the presence of some other unknown factor. The rate of weight-increase of the rats receiving wholemeal was almost exactly twice that of the rats receiving white flour with added vitamin B_1, and when after two weeks the diets of the two groups were exchanged the performances were similarly exchanged. The graph of the weights reproduces that of HOPKINS[1] for the classical experiment in which he demonstrated the action of vitamins in milk. Further analysis of Dr. CHICK'S results would seem to show that not only did the wholemeal promote weight increase more rapidly than the white flour despite the fact that the white flour was better digested and presumably better assimilated, but it also promoted it more economically. In order to gain a gramme in weight the rats needed less wholemeal than white flour. The experiment does not show what is the defect in white flour which diminishes growth and appetite; the author indicates that this is being sought. One or other of the known constituents of the water-soluble vitamins other than vitamin B_1 is suspected.

Some will still doubt whether a diet which promotes growth in a young animal will necessarily promote the well-being of an adult, who is no longer concerned with growth but with doing a day's work. The answer must be that in nutrition work growth is merely used as an index to show whether the animal is in a state of well-being and adequately nourished, rather in the way that the temperature is used in clinical medicine. The same vitamins are needed for growth promotion in the young as for maintenance in the adult. The young and the adult need all the same nutritional elements, except that the young need relatively more of them. Adults have to balance the continuous process of gain and loss of nutritional elements within their tissues; the young have to do the same but in addition to put down new tissues. We may safely conclude, then, that if one diet does not enable the young to grow and another does the second is also more nourishing for the adult than the first. And, if we accept that these findings in rats are applicable to man, we may argue that the signpost points to wholemeal as the high-road to better health and greater food economy, more particularly for the growing child but also for men and women. Political or economic considerations may make it impossible to take this road in wartime, but the general conclusion from the nutritional standpoint is not thereby affected.

1. Hopkins, F. G. *J. Physiol.* 1912, **44**, 433; reproduced in *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 167, p. 17.

PHYSIOLOGY OF SLEEP

No physiological theory of sleep is sufficiently well established to explain sleeplessness or to suggest convincingly how to overcome it. This is not because the theories are vague, but because no single one is able to explain away the facts which support its rivals. PAVLOV'S dog, conditioned to salivate a certain time after a stimulus, is first faced with the task of not salivating immediately after. PAVLOV devised many ways of making dogs exert their powers of inhibition, and since conditioned reflexes are accepted as a function of the cortex such inhibition was also regarded as cortical in origin. The fact, probably quite unexpected, that dogs fall asleep if the inhibitory effort is intense appears almost as a divine revelation of the cause of sleep. Yet HESS has demonstrated quite convincingly that cats with electrodes embedded in the hypothalamus will fall asleep when this part of the brain is stimulated, and wake up and behave naturally later. It is hard to make a theory of sleep which does no injustice to either of these convincing demonstrations. Chemical theories are based on evidence, not very satisfactorily confirmed, that cerebrospinal fluid transferred from a dog which has been kept awake to one which is fresh will put the fresh dog to sleep. The action of benzedrine, which is well known to produce wakefulness, forbids us to treat chemical theories too lightly. While it has been claimed that the nerve-cells of a dog killed after a very long period without sleep exhibit degenerative changes, observations on living men and animals after a single long period of sleeplessness fail in general to show any deleterious effect on various kinds of performance test. The only positive effect seems, in fact, to be that it is difficult to keep the subjects awake. The thresholds of sensation are, however, raised and proprioceptive impulses from the muscles probably fewer. KLEITMAN believes that cortical inactivity, due to a paucity of incoming stimuli, is the most important factor initiating sleep.

The secret possibly lies in some connexion between the hypothalamus and cortex. Pathological lesions and experimental manipulation alike show beyond doubt that interference with the posterior hypothalamus tends to produce a condition of drowsiness. CANNON believes that in this, the headquarters of the autonomic system, dominance of the parasympathetic element periodically occurs and produces sleep and general restoration of the body. It is now a

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commonplace that the cortex can influence the autonomic system, and it may be that the hypothalamus can interfere in some way with the function of the cortex—perhaps with its reception of impulses. It is, perhaps, simpler to accept a periodic fluctuation in cortical activity which matches the hypothalamic rhythm. The electrical activity of the cortex changes during sleep, and it is common experience that the exclusion of sensory stimuli and the relaxation of voluntary muscle predispose to sleep. Whether physical fatigue acts by means of chemical metabolites influencing the sleep mechanism, or simply by promoting relaxation and reducing afferent impulses, it is impossible to say; both might play a part. In assessing the importance of a chemical action—such as that of a drug—it must be remembered that with most people going to bed is a ritual, and that habit must strongly reinforce the other influences inducing sleep. A drug, therefore, which does not act on the central sleep mechanism might be efficacious by reducing an unduly excited person to a more insensitive condition at the time of going to bed.

Objective criteria—such as the strength of stimulus required to raise the blood-pressure of a sleeper—agree in showing that sleep becomes very deep in the first two hours, less deep in the next two or three, and thereafter becomes progressively lighter until waking occurs. Authorities differ regarding the importance of the last few hours of light sleep. It is difficult to find a standard by which to measure the degree to which sleep has been beneficial. Normal individuals probably need have little fear of lack of sleep, provided that six hours or so can be set aside for it. Lack of sleep, unless due to causes which absolutely prohibit it, is likely to cure itself, though the irregularity may be far from pleasant. It is notorious that people sleep more than they think they do, and that insomnia should be judged by its results rather than by the overnight subjective experiences of the victim. The story of the man who said "I dreamed I had been lying awake all night" is not entirely fanciful.

VENOUS LIGATURE AND PARTIAL ARTERIECTOMY

IN the last war MAKINS, TUFFIER and others established as a fundamental principle of vascular surgery that when an artery is tied the companion vein must be tied as well. Ligature of both vessels has the effect of retaining the limited amount of blood supplied by the collateral circulation in the part for a longer period. LERICHE and WERQUIN [1] maintain that ligature of an artery sets up vasoconstrictor reflexes in the vessel distal to the ligature, and that these can be so severe that the collateral circulation is obliterated and may not be restored in time to preserve the limb. They advise, instead of simple ligature, resection of part of the artery so as to interrupt the vasoconstrictor pathways. We lately noted [2] that BERARD and DARGENT were alive to the importance of vasoconstrictor reflexes in carotid ligature and had suggested the use of arteriectomy and venous ligature; SILVERSTONE and WATSON have also recorded better results with excision than with simple ligature of the carotid.

So impressed was LERICHE with the results of partial arteriectomy in the extremities that he went so far as to suggest its use in coronary disease. FAUTEUX [3] has now made some experiments in dogs to show the effect of (*a*) partial coronary resection and (*b*) partial coronary resection combined with ligation of the accompanying vein. He found that resection of 1·5 cm. of the descending branch near its origin was with one exception fatal, owing to the onset of ventricular fibrillation. This result was similar to that following ligation of the descending branch at the same level. But when partial resection was carried out, either at the same time as ligation of the vena magna cordis or a year afterwards, all dogs (apart from those dying of operative complications and intercurrent disease) remained healthy for over a year. Thus the result of ligation of the coronary vein confirms the general principle, and suggests its application as a preventive against a second attack of coronary thrombosis and in the treatment of angina pectoris. The fatal effect of coronary arteriectomy does not invalidate LERICHE'S postulate, because the heart, being liable to ventricular fibrillation, presents a different problem from a limb. Further experiments are in progress to decide whether the diseased coronary artery, no longer a blood-carrier, may act as a foreign body and disturb the coronary circulation by initiating vasospastic reflexes. FAUTEUX hints that a procedure which was fatal in normal dogs might yet benefit patients with coronary disease. GROSS [4] had previously reported attempts to increase the blood-supply to the dog's heart by ligating the coronary sinus. FAUTEUX repeated these experiments, using either ligation or partial obliteration by escharotic injections. He confirmed the mortality which attends ligation, and found escharotics undesirable owing to the necrosis which they sometimes produce. GREGG and DEWALD [5] have studied the immediate effects of occlusion of the coronary sinus on the coronary circulation, and have demonstrated that peripheral backflow is much increased in the descending branch, the blood containing only 3–4 volumes % of oxygen. These results indicate that occlusion of the coronary sinus is at too high a level, and that ligation of the vena magna is more likely to prove the method of choice for encouraging the blood-supply to a potentially infarcted area.

In both coronary and peripheral vascular disease infiltration or section of the regional sympathetic plexus has been used, on the afferent side to relieve pain and on the efferent to abolish vasospasm. The use of permanently destructive agents like alcohol for paravertebral nerve-block may be dangerous; the procedure can hardly fail to interrupt postganglionic efferent fibres as well, but it is a maxim of sympathetic surgery—proved in the treatment of Raynaud's disease—that interventions on the efferent side must be preganglionic for fear of sensitising the peripheral nerve-endings. It is possible, therefore, that the injection of alcohol into the upper dorsal ganglia for angina may end by aggravating the condition, an effect which might be avoided by the use of a less permanent agent like Procaine.

1. Leriche, R. and Werquin, M. G. *Lancet*, Sept. 1940, p. 296.
2. *Ibid*, Sept. 14, 1940, p. 334.
3. Fauteux, M. *Surg. Gynec. Obstet.* August, 1940, p. 151.
4. Gross, L., Blum, L. and Silverman, G. *J. exp. Med.* 1937, 65, 91.
5. Gregg, D. E. and Dewald, D. *Proc. Soc. exp. Biol., N.Y.* 1938, 39, 202.

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TREATMENT OF BACTERIAL ENDOCARDITIS

WHEN he first comes face to face with subacute bacterial endocarditis, especially if his patient is young and not yet worn down by the disease, the keen house-physician usually asks permission to try some form of intravenous "antiseptic"; his chief is sceptical, but agrees; in due course the patient dies. The explanation given for the failure of these remedies is that the streptococci, ensconced in platelet-fibrin vegetations on the heart valves, are beyond reach of the drug, or, more significantly, beyond reach of the leucocytes; the main blood-stream whirls the white cells past the valve so fast that they cannot settle, and the avascularity of the cusp prevents their access to the base of the vegetation. Yet after death many vegetations show some degree of healing by fibrosis at their bases, and there are on record rare examples of apparently complete healing. Fatal though the disease usually is, it is not a priori hopeless; it should not take much to sway in the patient's favour the battle between the bacteria and the processes of defence. The ingenious idea of combining sulphanilamide or sulphapyridine treatment with continuous heparinisation has therefore been discussed with interest in the last two or three years. Since BEST and his colleagues in Toronto have made purified heparin available it can be given intravenously to man in amounts large enough to prolong the clotting time of the blood very greatly and probably to check for the time being the deposition of fresh clot on endocarditic vegetations. This might give the drug and the natural defences an opportunity to get the upper hand.

Last year KELSON and PAUL WHITE[1] reported seven cases in which this attempt was made. In two it was early abandoned because of reactions to a toxic batch of heparin. In a third recurrent pulmonary infarction led to the treatment being stopped. A fourth died during the procedure with occipital and subdural hæmatomas. The remaining three received heparin continuously by vein for a week, before, during and after which they took 4–6 g. of sulphapyridine daily. In all three the fever abated and previously positive blood-cultures became negative; one still had congestive heart failure, attributed to rheumatic carditis, 19 weeks later, one was apparently recovered and at work 18 weeks later, and the third remained well for at least 4 weeks. This was no more than moderately encouraging. At the same time FRIEDMAN, HAMBURGER, and KATZ[2] reported one case treated with heparinsation only in which the patient died after 10 days from cerebral hæmorrhage. More recently WITTS[3] had a similar experience. On another page Dr. C. M. FLETCHER describes his efforts with a further case. He was balked at first by a batch of heparin which had much less than its alleged anticoagulant value in man; this he attributed partly to varying methods of standardisation among different manufacturers, partly to varying susceptibility among the bloods of different human subjects. Eventually, however, finding a heparin that prolonged the clotting time of his patient's blood to 3½ times its normal value, he gave 10,000 rising to 50,000 units of it every day by continuous intravenous drip to a patient with *Streptococcus viridans* endocarditis, who received also 4 g. of sulphapyridine daily. On the fourth day the patient woke with headache and vomiting, and died in two hours of multiple cerebral hæmorrhage, verified post mortem. This appears to be the major danger of heparinisation in this disease.

There is little as yet, then, to justify any widespread use of heparin and sulphapyridine in bacterial endocarditis, and no doctor need have it on his conscience if either expense or risk deter him from instituting this treatment. It were well that a few more trials should be made, perhaps as FLETCHER suggests on cases whose streptococci are susceptible in vitro to sulphapyridine, and they should be reported even if they are unsuccessful. But on present evidence there seems to be more hope in further chemotherapeutic developments than in the adjunction of heparin.

1. Kelson, S. R. and White, P. D. *J. Amer. med. Ass.* 1939, **113**, 1700.
2. Friedman, M., Hamburger, W. W. and Katz, L. N. *Ibid*, p. 1702.
3. Witts, L. J. *Brit. med. J.* 1940, **1**, 484.

MORE HOSPITAL GROUPING

THE regionalisation of hospital services was carried a step further at a meeting held at Bristol on Oct. 11. A conference of representatives of municipal authorities, voluntary hospitals and medical organisations in the city of Bristol, over which the Lord Mayor of Bristol presided, resolved that a drafting committee should be appointed to prepare a constitution for a divisional hospitals council in Bristol and for considering the formation, in collaboration with other divisional councils, of a Bristol and Western regional hospitals council in association with the Nuffield Provincial Hospitals Trust. The conference was addressed by Mr. W. M. Goodenough, chairman of the Nuffield trustees, and by Sir Farquhar Buzzard, chairman of the trust's medical advisory council. Sir Farquhar stressed the importance of thinking in terms of medical services rather than individual institutions. The divisional council, through the active coöperation of the municipal authorities, the voluntary hospitals and the university, could provide a unified medical service in the division. Bristol should be the centre of a region composed of several divisions.

DOCTORS' CHILDREN SENT OVERSEAS

THE Children's Overseas Reception Board has suspended its work for the winter, but children can still be sent privately to the Dominions and the United States. Members of the British Medical Association in Australia have offered to receive a large number of doctors' children between the ages of 5 and 16 and a smaller number accompanied by mothers. Members of the New Zealand branch of the association have offered to look after 68 Protestant children (34 boys and 34 girls) and 3 Roman Catholics (2 boys and 1 girl). Mothers are not included in this invitation. Doctors in Canada previously offered to take 1100 children sent under the Government scheme. The Canadian Medical Association now says that unaccompanied children sent privately will be received in medical homes in Canada, and that the Canadian Government will be responsible for their welfare. Finally, the American committee for the evacuation of children is prepared to receive applications from doctors wishing to send unaccompanied children between the ages of 5 and 16 to the United States. Inquiries should be addressed to the secretary of the British Medical Association.

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Annotations

KNIGHTS HOSPITALLERS

SOME time in the eleventh century a band of Italian merchants obtained from the Caliph of Egypt permission to build a hospital in Jerusalem for the care of pilgrims. They called themselves the Poor Brethren of the Hospital of Saint John, and their order quickly spread to include knights of almost every country in Europe. They were vowed to the twofold task of fighting against the Turks, and of tending those whom they charmingly termed "our lords the sick" irrespective of creed or race. The second of these duties they have performed unremittingly up to the present day. In his well-documented and beautifully illustrated book[1] Colonel Erskine Hume, himself a knight of the order, has traced its history through nine stormy centuries. The knights were driven from their original foundation in Jerusalem to one island after another, but whether at Cyprus, Rhodes, or Malta, they never failed to establish their hospital, the "Palace of the Sick." Colonel Erskine Hume gives in full the regulations for the great hospital at Valetta in the sixteenth century. Although its patients fed off silver and were nursed by knights of sixteen quarterings the administration was essentially similar to that of a great modern hospital. There were elaborate arrangements for the reception and care of patients—including the somewhat depressing rule that they should make their wills forthwith—there was an outpatient department, a dispensary, a resident medical staff and daily rounds by the physicians and surgeons, as well as a sort of district-nursing service among the poor of the island. By one curious regulation two years service as prior of the hospital was equivalent to an expedition against the Turks. In many respects the knights were far ahead of their time, as in the separation of the different types of disease, and in their insistence on the study of anatomy and dissection, at a time when this was accounted almost criminal in the rest of Europe.

The later work of the order is well known. After they had lost their headquarters in Malta the knights continued, and continue, the work in their separate countries, under one grand master, at present Prince Chigi-Albani. Colonel Erskine Hume gives us many interesting details of their modern activities, and it is refreshing in these times to encounter an international foundation with such a record, which has weathered the storms of nine centuries and still shows no sign of decay.

SPREAD OF PARADOXICAL METASTASES

OUR knowledge of the spread of cancer is still incomplete, as the appearance of the so-called "paradoxical" metastases in the skull, vertebral column, and limb girdles remind us. Dr. O. V. Batson,[2] not satisfied with the suggested methods of spread by nerve sheaths or lymph vessels, has carried out experiments to discover another route, and finds that the vertebral veins appear to be implicated. The dorsal vein of the penis in an adult cadaver was injected with Weber's vermilion, which is radiopaque and readily followed in the tissues under the fluoroscope; 20 c.cm. was injected without resistance, the material spreading readily out in the veins in and about the sacrum. The veins of the ilium and lower lumbar spine also became injected, but surprisingly, none of the material reached the inferior vena cava. As the injection material was increased it was seen to progress up the spine through successive segmental regions until 200 c.cm. had been used, by which time it had reached the base of the skull and entered the cranial cavity. It had also penetrated to the venæ vasorum of the femoral vessels, thus giving a composite picture of the metastatic pattern of advanced cases of carcinomatosis with primary origin in the prostate. Repeated experiments have shown that this course of spread was not accidental. The vertebral system of veins has a rich anastomosis at each spinal segment with the veins of the thorax and abdomen; moreover it is a system almost without valves, in which the pressure is very low. It seemed likely that when, as in lifting and coughing, pressure in the abdomen and thorax was raised, blood would flow not into the inferior vena cava but into the vertebral system of veins. To simulate an increase of intra-abdominal pressure, such as occurs in coughing, a towel was tied round the abdomen of an anæsthetised monkey, and an injection made into the dorsal vein of the penis, colloidal thorium dioxide being used instead of vermilion. Here, in the living animal, the flow was similar to that in the human cadaver and again demonstrated the pattern of carcinoma spread from the prostate.

The vertebral veins are thin-walled and have considerable volume but are difficult to identify when empty. They are storage lakes where stagnation is frequent, and have many connexions with veins of the body cavities at each intervertebral space. They also communicate with the veins of the body wall, including those of the breast, and with the azygos system of veins. Injections into breast venules seemed to follow the pattern of breast-cancer spread—i.e., into the spine, ribs, shoulder-girdle, and skull. It seems possible that tumour and abscess material from many regions may be squeezed, by straining or by coughing, into the vertebral system without involving the portal, caval, or pulmonary system, and this would explain why the lungs are not involved, a constant stumbling block to current theories. The disasters following perirenal injections of air for purposes of diagnosis and the cases of blindness after pneumothorax are certainly due, Dr. Batson thinks, to air embolism in the vertebral venous system.

ASPIRIN AS A GARGLE

THE value of antiseptic gargles has always been more or less suspect. Prof. David Campbell in his "Handbook of Therapeutics" says bluntly: "Gargles are really of very little use in throat affections, as they do not reach beyond the anterior pillars of the fauces." Some grant that they are often soothing to the patient, but say that to be of any value they must be hot, when they act merely as fomentations; what the hot water contains is of little moment so long as it is harmless. Still others back their own fancy mixture of phenol and bicarbonate, or what you will. Lately the curious practice of employing powdered aspirin stirred in lukewarm water as a gargle has been gaining in popularity. It is true that aspirin in solution has an antiseptic power about equal to that of phenol, but since acetylsalicylic acid is non-volatile and is soluble only to the extent of 1 in 300 in cold water, though it is more so in warm water and possibly in saliva, there seems to be little to recommend it as an antiseptic in a gargle. The aspirin gargle is esteemed also as a local analgesic in sore throat and after tonsillectomy, but the relief of pain may be partly due to the central action of the drug after absorption, for the instructions are explicit that the aspirin should eventually be swallowed. A totally unexpected incrimination of aspirin when used in this manner comes from a chemical study by Dott,[1] who has investigated the effects of aspirin solutions on the teeth. His brief paper demonstrates beyond doubt that appreciable quantities of the calcium of the teeth go into solution when an aspirin gargle is used. Dott's analyses, confirmed substantially by the independent observations of Dr. J. C. Thompson of the clinical laboratories of the Edinburgh Royal Infirmary, suggest that aspirin used as a

1. Medical Work of the Knights Hospitallers of St. John of Jerusalem, by Edgar Erskine Hume, Lieut.-Colonel Medical Corps, United States Army: Knight of Honour and Devotion of the Sovereign Military Order of Malta. Baltimore: The Johns Hopkins Press. Pp. 371. $3.
2. *Ann. Surg.* July, 1940, p. 138.

1. Dott, D. B. *Edin. med. J.* October, 1940, p. 700.

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gargle over a number of years might well result in permanent damage to the teeth. The faintly alkaline solution of sodium salicylate obtained by dissolving equal weights of aspirin and sodium bicarbonate has no appreciable effect on the teeth, and the same presumably applies to calcium, lithium and magnesium aspirins.

ÆTIOLOGY OF ACTINOMYCOSIS

IT used to be taught—and the belief is not quite dead—that actinomycosis was caused by a streptothrix carried in from the soil on ears of oats and wheat or ends of straw, but when it was shown that the pathogenic actinomyces requires anaerobic conditions and body heat for its maintenance this view had to be abandoned. The frequency of the clinical condition among the farming community suggested that infection was transferred from cattle or pigs to man, but the occurrence of infection where there has been no such association and the demonstration by Erikson [1] that the human strains have cultural differences from the animal strains indicated that domestic animals were certainly not the only sources of the pathogenic actinomyces. Sullivan and Goldsworthy [2] have lately published the results of a bacteriological investigation of 100 periodontal pockets and 24 carious teeth; from these sources they isolated 6 strains of micro-aerophilic actinomyces which were identical in their cultural and fermentation reactions with those of 5 strains recovered from actinomycotic lesions. They thus confirm earlier work that the *Actinomyces israeli* (the name suggested by Erikson for the human strain) is present in the mouth as a normal saprophyte, but ready to initiate infection when the oral mucous membranes have suffered any trauma. This is doubtless the reason for the not infrequent occurrence of actinomycosis after teeth extractions—e.g., impacted wisdom teeth—and probably explains some at least of the cases associated with ears of wheat and the like which may lacerate the mucous membrane. The case for an animal origin of some of the human lesions must be regarded as still not proven.

DENTURES AND INDENTURES

UNTIL the eighteenth century the dentist made dentures with his own hands and it was only when he wanted to use sheet gold that he called in a craftsman to help him. During the nineteenth century the development of accurate casting, vulcanising, the use of impression materials and of porcelain teeth increased the demands on the dentist's time and led him to employ a mechanic, who carried out work-room processes while the dentist was engaged directly with the patient. A highly skilled body of dental mechanics appeared in response to this need, men with a wide knowledge of metallurgical processes. But of late years mere repetition work in mechanical dentistry has abolished the demand for craftsmen, and where his predecessor served a long and necessary term of apprenticeship the dental mechanic of today is often inadequately trained even in the simple processes required of him. This situation led the three dental associations in 1938 to set up, with the cognisance of the Ministry of Labour, a committee under the chairmanship of Mr. R. E. HeegaardWarner, L.D.S., to inquire into the training, conditions of service and wages of dental mechanics.

In their report [3] they examine practices which have contributed to the present situation. They trace weakness in the training of mechanics to the decline of the apprenticeship system. The dentist himself studies the mechanics of his profession as part of his training: indeed, he puts in nearly two years work on this aspect of dentistry but when he goes into practice it is more economic for him to employ a mechanic or, if he cannot afford that, to make use of the services of the laboratory of an owner mechanic and his staff of juniors. These laboratories tend to specialise, so that mechanics working in them get no general training and very little individual tuition, especially in new or costly processes where bungling might mean the loss of expensive material. In contrast, teaching schools like the Borough Polytechnic and the hospitals give the student mechanic good training; but dental laboratories are costly to equip and the numbers attending classes are relatively small, so that few education authorities are willing to establish training schools.

The committee recommend that candidates should be selected for training after a trial period of three months, and then apprenticed by indenture for a term of not less than five years. They do not recommend that employers should charge a premium. The indenture, they consider, should require the apprentice to attend, at some stage, a technical school for additional instruction in dental mechanics and related subjects. Where temporary juvenile labour must be used by a master mechanic, the boy should be warned of the lack of prospects and not engaged for more than three years. The committee believe that if the apprenticeship system were restored dentists would seek the services of mechanics who had taken out indentures and undergone a recognised period of training; a training-school certificate would be additional evidence of skill. They consider that a trained mechanic should receive a wage of not less than £3 10*s.* for a forty-four hour week.

CONTROL OF MALARIA IN MALAYA

OF forty-one species and subspecies of *Anopheles* recognised in Malaya, only five are malaria carriers. Their control, however, is a major problem which was discussed during the sixth international course in malariology at the Institute of Medical Research, Kuala Lumpur,[1] in 1939. The five offenders have distinctive breeding characteristics which are a guide to control. *A. maculatus* breeds in the sunlit-streams and seepage of rubber estates in hilly land. Suitable breeding places have been unintentionally created by the extensive replanting programme begun in 1936; old rubber trees were removed leaving holes in the ground and terraces were constructed on hilly lands for contour planting, in order to minimise soil erosion. Other vectors are *A. umbrosus* and *novumbrosus* which are shade breeders with a predilection for jungle swamps; *A. sundaicus* is an addict of brackish water and *A. barbirostris* a pool breeder in overgrown borrow pits and mining holes. In devising a system of antimalarial organisation the area to be protected must be defined; the breeding places of anopheline vectors within it must be ascertained and a system of weekly records of antimalaria work kept. The anopheline vectors have an effective range of about half a mile, but unfortunately, as observations made in 1937 and 1938 by Dr. W. E. Holmes show, under the conditions brought about by replanting *A. maculatus* can cover about three times that distance in sufficient numbers to cause a serious outbreak of malaria. The area must be mapped with a primary circle of a radius of half a mile, the centre being the labourers' lines; secondary circles are then taken from staff bungalows, so that the intervening ravines can be adequately supervised. All streams, seepages and pools within the defined area are examined for anopheles larvæ, and if the survey is made between early March and June, the most active breeding season of *A. maculatus*, it will afford a reliable idea of the malaria potentialities of the area. One valuable measure is to drain the subsoil by placing all visible water in pipes underground; this can be reinforced by open earth drains and the use of larvicides, such as prepared oil mixtures or Paris green. Control of urban malaria requires special measures, being

1. *Spec. Rep. Ser. med. Res. Coun. Lond.* 1940, No. 240.
2. Sullivan, H. R. and Goldsworthy, M. E. *J. Path. Bact.* September, 1940, p. 253.
3. To be had for 1*s.* 6*d.* from 13, Hill Street, London, W.1.

1. Howard, S. C., Holmes, W. E. and Wilson, T., *Bull. Inst. med. Res, F.M.S.* 1939, No. 2.

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bound up with legal rights or ownership. Suitable by-laws have been formed to enable the local authority, after due notice, to enter on dangerous land and carry out any works deemed necessary for preventing the breeding of mosquitoes. It is nearly always to the financial advantage of the owner to have the work carried out by the local authority. In order to minimise the breeding of anopheles in cattle hoof-marks, cattle sheds are forbidden within the town limits unless specially licenced; by-laws exist to prevent the grazing and straying of cattle on lands where their presence is likely to favour the propagation of mosquitoes. Breeding in lakes is controlled by clearing and oiling the edges and by the suppression of water-weeds which give cover to mosquito larvæ. This has been successfully achieved by stocking the lakes with weed-eating and larvæ-eating fish. Fish ponds used by Chinese squatters to breed edible fish require control to prevent the propagation of *A. barbirostris and A. sinensis*. Rivers have to be canalised. Passive infiltration by dangerous mosquitoes which are introduced by trains and other vehicles is best controlled by hand-catching.

Dr. T. Wilson, health officer of Lower Perak, has paid special attention to suppression of malaria in Malayan "*kampongs*," or village communities, where education and propaganda are useful. In many rural areas the treatment of active cases may be the only practical method of control, but it does little to reduce the spread of the disease. The possibility of success with drug prophylaxis depends on local conditions. In Malaya the population is scattered and there is no definite malaria season. Administration of drugs must be continuous and is relatively so costly that it is unpractical.

COLD PRESSOR TEST IN PREGNANCY

SOME say that in the ætiology of hypertension there is a constitutional factor, which may be either an oversensitive vasomotor centre or an abnormal reactor mechanism. On this view Hines and Brown [1] devised a standard test for measuring the variability of blood-pressure, the response to which might be an index of a pre-hypertensive condition. The technique of the test is simple. After a rest in the recumbent position for not less than a quarter of an hour the basal systolic blood-pressure is recorded, and then, with the sphygmomanometer cuff still in readiness on one arm, the other hand is placed in ice water at 4–5° C. Blood-pressure readings are taken after 30 sec. and 60 sec., when the hand is withdrawn from the ice water. Readings are then taken at every two minutes until the basal level is again reached. Three points in response are considered important. First, the range of response, which is the difference between the basal level and the highest level recorded after the hand is placed in the bath; the normal here is in the region of 20 mm. of mercury. Secondly, the peak or highest recorded reading, the normal of which is placed at 145 mm. Hg. Thirdly, the time taken to return to normal after removal of the hand from the bath; this should not exceed two minutes. Hypertension ordinarily takes many years to become established, but in pregnancy complicated by a pre-eclamptic toxæmia years are contracted into months and even weeks, so that an abnormally high reading for the cold pressor test might reasonably point a warning finger at those women who are destined to become toxæmic. Professor Browne,[2] whose writings have done so much to draw attention to the early diagnosis and timely prophylaxis of pregnancy toxæmia, has carried out the cold pressor test with slight modifications on 75 primigravidæ, in 52 of whom he was able to appraise its value. He regards a peak reading of 130 mm. Hg as suspicious, a lower figure than Hines and Brown. In 23 of his patients the peak reached or exceeded this figure and in 12 of these pre-eclamptic toxæmia resulted; 9 of the 23 had a reading of 140 mm. or over and 6 developed toxæmia, while of 5 whose peak was 150 mm. or over 4 developed toxæmia. Of the remaining 29 patients in whom the peak was below 130 mm. only 11 developed toxæmia. He concluded that the higher the peak the more likely the development of subsequent toxæmia. The peak, however, is partly determined by the range, and it follows that a high basal blood-pressure, even though the range is normal, may indicate that toxæmia will follow later; in his series the mean basal systolic pressure was 108 mm. Hg among patients who remained normal, and 116 mm. Hg among those who developed toxæmia later—a significant difference. He concludes that a high basal pressure is therefore valuable as a pointer. He is unable to show that a high range or a prolonged time—i.e., over two minutes—in the return to normal is of any significance in picking out likely candidates for toxæmia. The test thus seems to tell us little more than an accurate straightforward blood-pressure, while it has the disadvantages of expending time and upsetting the patients, who are notoriously susceptible to even trivial scientific investigations (two of Professor Browne's patients fainted during the test). There seems then to be no valid reason for adopting the cold pressor test in antenatal clinics in place of the well-established ordinary blood-pressure readings.

1. Hines, E. A. Jr. and Brown, G. E. *Ann. intern. Med.* 1933, 7, 209.
2. Browne, F. J. *J. Obstet. Gynæc.* August, 1940, p. 365.

HISTOLOGICAL EFFECTS OF THOROTRAST

FURTHER observations on the local histological effects produced in rabbits by the intraperitoneal injection of thorotrast have been made by Efskind [1] at the Rikshospital, Oslo. He found that most of the substance was deposited in the omentum, mesentery, diaphragm and tendinous aponeuroses of the anterior abdominal wall. It persisted in these sites for the whole of the six-months period of observation. Degenerative changes in the nuclei of the endothelium were found in the eighth week after injection accompanied by appearances interpreted as amitosis and pseudoamitosis resulting in the formation of giant cells. The latter, however, did not persist or give rise to further cell forms. The histological picture resembled that obtained at an earlier stage after roentgen irradiation of the peritoneum. Proliferation of the peritoneal connective tissues was observed in the later stages accompanied by multiplication of blood-vessels and lymph-vessels. The new tissue so formed sometimes gave rise to papillomatous formations which were chiefly found on the abdominal wall and diaphragm, seldom on the omentum. In other experiments Efskind preceded the injections of thorotrast either with injections of various irritants, such as bacteria or vital dyes, or with roentgen irradiation, but these measures did not alter the specific effects caused by the thorotrast. In his experiments no malignant tumours were produced, but it may well be that the period of observation was not long enough. In Foulds's [2] experiments on guineapigs 2½–3 years elapsed before the appearance of sarcoma and carcinoma, while the corresponding period in Selbie's [3] experiments on rats was 11 months. There is, moreover, some evidence that the susceptibility of different species to carcinoma formation varies, rabbits and mice being more resistant than rats. The susceptibility of man is unknown but the crucial period for the earlier recipients of injections is probably at hand.

1. Efskind L. *Acta chir. Scand.* 1940, 84, 79.
2. See *Lancet*, 1938, 2, 1548.
3. Selbie, F. R. *Ibid*, 1936, 2, 847.

Prof. THOMAS SINCLAIR who has represented Queen's University, Belfast, in Parliament for almost twenty years has retired on grounds of health..

The third list of subscriptions to the Medical War Relief Fund brings the total amount contributed to £6616.

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Parliament

THE House of Commons spent Oct. 17 in surveying national health policy as it is affected by war-time conditions. Mr. R. J. DAVIES called for an extension of National Health Insurance, particularly to meet the conditions created by war. Millions of troops in this country, he said, were provided with excellent medical attention but a large section of the civilian population were not. Medical attention should be extended to the whole of the wage-earning classes—some 40,000,000 of the population.

Minister of Health takes Stock

Mr. MALCOLM MACDONALD agreed that the health of the people was as important as the need to pile up a powerful armament. If the people were unhealthy the production of war implements would flag and halt. But the good health of the nation was on the march. The number of children in England and Wales who died before their first birthday in 1939 was 50 per thousand born—the lowest figure ever recorded, 3 per thousand less than the figure for 1938, and less than half that for 1914. In 1939 the number of women who died in child-birth for each thousand total births fell to 2·82, which was also the lowest figure ever recorded in this country. The death-rate from tuberculosis did not show any decline; the crude death-rate from all forms of tuberculosis last year was 636 per million living souls—1 per million higher than in 1938, but less than half the figure for 1914. Only one case of smallpox was notified last year; the reports of scarlet fever and diphtheria were fewer than in the year before; and the anticipated biennial measles epidemic failed to put in an appearance. On the other hand, there had been an ominous increase in the incidence of cerebrospinal fever, but even this disease was not so formidable as it was two or three years back, owing to the discovery of M. & B. 693. By the spring of this year that drug had already reduced the proportion of deaths from cerebrospinal fever almost to a third of the customary figure. Other sulphonamides were healing wounds more swiftly and proving effective in other diseases, notably pneumonia and puerperal fever.

STRAIN ON THE HEALTH SERVICES

The outbreak of war threw a new kind of strain on the health services. There were emergency homes in the country able to cope with some 2800 confinements every month, and this provision could be augmented whenever necessary. The number of expectant mothers leaving London just now was over 500 each week. City children evacuated to the country areas must be expected to benefit from the fresh air. Provision for adequate quantities of the right kinds of food was receiving attention. The inauguration of the nation-wide scheme of cheap or free milk for nursing mothers and infants was a milestone on the road to national good health. Health authorities on the outbreak of war had made plentiful provision for the care of the wounded by the recruitment of an army of doctors and nurses. It had been necessary to prepare for civilian as well as military wounded. In the Emergency Hospital Service, under one supreme operational direction, had been joined the fine equipment and great resources of the voluntary and municipal hospitals. To these had been added other public institutions, which by the provision of operating-theatres, X-ray apparatus and other supplies had been converted into first-class hospitals; in many cases these established buildings were now surrounded with whole villages of brand-new up-to-date huts, which could hold tens of thousands of extra patients. The cottage hospitals had been expanded; several mansions had been equipped as auxiliary hospitals, and supplies were stored in others. The halls and classrooms of some of our schools could be transformed into wards at a few hours' notice if the need arose.

MEDICAL LESSONS OF WAR

At the time of the withdrawal of the B.E.F. from Dunkirk some of the hospitals on the south-east coast became casualty clearing stations to which the wounded were borne straight from the field of battle. Further inland, the base hospitals opened their doors. In a week many thousands of casualties were admitted. The surgery, the doctoring, the nursing proved themselves of a high standard. A return from the London hospital sector, which bore the brunt of the work, indicated that even there only 1·7% of the men died of their wounds.

The battlefield was a laboratory into which, in a few weeks, were crowded experiences and opportunities for surgeons and doctors which at other times would not come to them in years. The first 12 months of war had already yielded its harvest; remarkable advance had been made in blood-transfusion, and in the storage of plasma. Valuable facts had been learned about the healing of burns, and there had been progress in the treatment of injured jaws and in plastic surgery. Rehabilitation of the wounded—whether military or civilian, due to war or the normal risks of industry—was being given full play in the Emergency Hospital Service. He had appointed an adviser in rehabilitation, and was also forming a strong committee of medical men to encourage its development in order that it might be the nucleus of an organisation of progressive value to victims of industrial and other accidents when peace returned. He paid a high tribute to the stretcher parties, the first-aid units, the ambulance teams, and the hospital orderlies, nurses and doctors who had performed their tasks—often under fire—with inexpressible coolness and skill.

USES FOR HOSPITALS

The numbers of casualties were slight in comparison with the strenuous and wanton efforts which the German airmen were making. At the moment only some 5500 beds in the wards were filled by air-raid casualties. It would be a mistake to feel too much assurance from that fact or to assume that we should not suffer worse before the enemy was finally beaten back from London to Kent, and from Kent across the Channel, and from the Channel over Europe until he was smashed on the soil of Germany itself. Large numbers of beds must be kept empty and ready to receive sudden casualties or sick in force, but not too many. There were other needs of the nation at war, and the authorities of the E.H.S. had been swift to recognise that they could play a great part in relieving them. The emergency hospitals were to be used for nursing the military sick, but he had agreed with the Minister of Labour that munition workers who fell ill away from their homes should also be nursed in them. In addition, large numbers of tired mothers and their children who were being evacuated from London were being taken for two days in a hospital ward in the country, where they had the best of care and an opportunity for rest, refreshment and recovery before going on to their billets. Moreover, the country hospitals were making room for many hundreds of invalids and aged and infirm people who, under war conditions, could not be cared for in their own homes.

VENEREAL DISEASE

The incidence of venereal diseases had shown a large and steady decline over the last twenty years, but there had been indications during the last few months that it was once more on the increase. This was partly a result of the new large congregations of population which had been created round military camps and in the neighbourhood of expanding war industries. In these places there was often no established service for the treatment of venereal diseases because there had previously been no great volume of cases to be dealt with. The service must now be extended. But the burden of financial responsibility should not fall mainly on the local authorities. He was asking them to maintain or expand their treatment service or to create new units where necessary, and he was also informing them that there would be an Exchequer grant of 75% of the cost. Officers of the Ministry were helping to establish an effective organisation. In many rural areas a mobile unit would be the best means of achieving results.

PROTECTION FROM AIR ATTACK

Mr. MacDonald assured the House that the Ministry of Health and the Home Office were closely coöperating in connexion with the health aspects of the shelter problem. They had the advantage of the advice of an expert committee under the chairmanship of Lord

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Horder. He and his colleagues had spent much time studying conditions in the London shelters and and made a number of valuable recommendations every one of which was being acted on. The committee would watch the situation continuously, and their field of work covered the whole country. A proper standard of provision for health must be preserved in all the large shelters; the Ministry was coöperating with the local authorities and their medical officers of health; Mr. MacDonald was also appointing in the Ministry a body of medical experts who would see that the standards laid down were maintained. The burden of the problem, he said, is overcrowding. If the population in each of these refuges can be reduced to reasonable proportions, protecting them not only from bombs but also from germs and parasites becomes much simpler. Therefore the policy of evacuating people who can be spared from London gains added importance as winter approaches. And by a steady process of persuasion that policy is bearing abundant fruits. Already some 489,000 schoolchildren, about 56% of the whole school-child population in the London evacuation areas, have left. Mothers and children are now leaving London at the rate of several thousands each day. Some hundreds of the aged and infirm, who are amongst the most difficult problems in the shelters, are being taken out every few days to be cared for in hospitals and homes in the country. It is of supreme importance that the night-dwellers in shelters should be able to lie down in comfort and sleep the sleep of the just. That state of affairs will be achieved when the bunks have been set up. A healthy standard of sanitary equipment was being provided, and the local authorities had been given full power to engage whatever staff was required for proper cleansing. The medical officer of health in each borough was being made responsible for frequent inspection of public shelters. In each shelter holding more than 500 people there would be a first-aid post, which would contain supplies for dealing with headaches, ear-aches and other minor ailments, and also a sick-bay, in which people could be partially isolated. A nurse would be in attendance in the shelters every night and arrangements would be made for a medical practitioner to be attached—either in residence through the night or else available on call—to each of the large shelters. Inhabitants of the shelters who contracted infectious diseases or other serious illnesses would be sent to hospital. Other aspects of the problem were being examined, such as ventilation and the possibility of using some spray for disinfection. The Ministry was in close consultation with the Medical Research Council.

In the House of Lords the DUKE OF DEVONSHIRE, in a discussion of the problems arising out of the German bombing attacks on London, said that it was true that the Government had overestimated the number of casualties and had underestimated the amount of damage to property. The Home Office still supported the policy of dispersal rather than concentration in the provision of air-raid shelters. The Government were pressing on with the provision of more dormitory accommodation in shelters. More than a million bunks were on order and their installation would begin next week.

Some Criticism

In the debate which followed Dr. H. B. MORGAN said that the voluntary-hospital system was out of date; its finances were precarious and its administration wrong. Was the Minister of Health's policy for the future to bolster up that system and to extend the approved-society system, or was he going to accept the principle that every citizen was entitled to the best medical attention available irrespective of class, economic status or anything else?—Dr. HADEN GUEST said that the danger to the health of the civilian population was one of the greatest which threatened our war effort.—Sir FRANCIS FREMANTLE urged that rehabilitation should be carried out as thoroughly as possible. The B.M.A. had set up a commission on which two representatives of the Parliamentary Medical Committee had been appointed to serve, to inquire into the future of medical and hospital services. A great deal of latitude must be allowed. The extension of hospital and medical services was a model of prevision on the part of the last Government and the present one. Such extension at a time when it appeared to be useless had been much criticised, but we now knew how necessary it had been. There was nothing superfluous in it, although there were some hospitals still waiting for the work for which they were designed.—Dr. EDITH SUMMERSKILL said that the time had come when profit should be eliminated from the practice of medicine. A revolution had taken place in the medical services during the last seven weeks. Doctors in east London with vast panel practices had found their security gone and their practices dispersed. In Harley Street where were the cars outside doctors' consulting-rooms? Their wealthy patients were in the provinces. Doctors in west London were thanking God for the emergency medical services because they had got state support and could face up to their commitments.

Education Minister on National Physique

In the Commons on Oct. 16 Mr. RAMSBOTHAM, the President of the Board of Education, explained the policy underlying the physical-training side of the proposals he introduced last August. He warned the House that many months must elapse before he could report any measurable advance. The important thing in such a scheme is finance, and Mr. Ramsbotham is taking steps to see that adequate provision is made on that score. He estimated that the expenditure of local authorities would be two or three times larger this year than last. The aim in view, while it had a solid basis in improvement of the national physique, was, he said, also directed to the development of character and intelligence. It is a great pity that physical training should cease for boys and girls at 14 when children's bodies are still as immature as their minds. Unhappily at the present time it is impossible to undertake an extension of physical education within the framework of extended full-time education. But unless conditions become much worse it is thought to be a practical proposition to adopt the part of the Fisher Acts concerning physical education and involving the release of boys and girls from their work for an hour or two a week. Even this limited proposal, however, will require a great deal of preparation and organisation. For the moment the proper course is to help the local authorities and voluntary associations to extend and improve the physical education they are already providing. Mr. Ramsbotham described the steps he is taking to obtain the release from the Army, and prevent the further calling up, of key men who will be needed as instructors, organisers and leaders of the youth-training movement. The directorate have been instructed to lose no time in consulting their medical advisers, and doctors generally, on the measures necessary to ensure that the medical side is properly safeguarded, and the National Youth Committee is taking full advantage of the advice of Lord Dawson of Penn.—In the subsequent debate Sir FRANCIS FREMANTLE and others gave the scheme a warm welcome while strongly emphasising the importance of adequate medical supervision.

Money

Miss HORSBRUGH, parliamentary secretary to the Ministry of Health, announced in the House of Commons that additions to the supplementary pensions ranging from 1*s.* to 2*s.* a week will be made throughout the coming winter to needy cases.

Sir KINGSLEY WOOD in moving a vote of credit for £1,000,000,000 for war expenditure said that for the four weeks ending on Oct. 12, the total expenditure had averaged over £64,000,000 a week, a daily rate of more than £9,000,000.

QUESTION TIME

Rehabilitation

Mr. ELLIS SMITH asked the Minister of Pensions why men had been discharged after suffering from amputation without being supplied with artificial limbs; were the provisions for the rehabilitation of disability cases in operation; had the arrangements for the training of disability cases in order to equip them for industry been made, and were they in operation; and would he make a full statement on these problems.—Sir W. WOMERSLEY replied: I am medically advised that a short interval should elapse between the healing of a stump and the fitting of an artificial limb. No good purpose is served by keeping the man in hospital during this time and

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he is accordingly discharged to his home, to which he is usually anxious to go, and is given a provisional pension at the 100% rate. As soon as the stump has settled down he is fitted with a limb at one of the Ministry's limb-fitting centres. The initial stages of rehabilitation are carried out while in hospital, and an interdepartmental conference convened by the Minister of Health has had under consideration the arrangements to be made for the completion of rehabilitation. A similar committee appointed by the Minister of Labour has been considering the arrangements for vocational training.

In answer to a question on the rehabilitation of civilians Mr. M. MACDONALD said that under the Emergency Hospital Scheme special centres, including remedial therapy departments and workshops, had also been established for the treatment of orthopædic and other types of injury which require rehabilitation.

Tuberculosis in Scotland

In answer to a question the Secretary of State for Scotland gave the following table of deaths in Scotland from tuberculosis:

1938	3rd quarter	766	1939	3rd quarter	782
	4th quarter	769		4th quarter	806
1939	1st quarter	995	1940	1st quarter	1180
	2nd quarter	943		2nd quarter	1069

He added: It is too early yet to say whether the recent rise in the tuberculosis death-rate has been simply due to the exceptionally trying weather conditions last winter in Scotland, which bore with particular severity on persons suffering from chest weaknesses.

Price of White and Brown Bread

Sir ERNEST GRAHAM-LITTLE asked the Parliamentary Secretary to the Ministry of Food whether he was aware that a recent report of the Wartime Social Survey, issued with the authority of the Ministry of Information, indicated that at least 66% of all classes of the population ate brown bread, and that this would be increased if the cost of brown bread were reduced to the level of white bread; and if he would reconsider the arrangements for provision of a national loaf and adopt a war-bread more in accordance with expert opinion.—Mr. R. BOOTHBY replied: The sample inquiry only covered selected districts in London and one provincial city. The percentage of those questioned who had purchased a brown loaf in the previous week varied in different districts between 38% and 65%. In only 11% of the cases was price given as a reason for purchasing white bread instead of brown.

Evacuation

The extension of the Government's evacuation scheme, said Mr. MACDONALD in reply to a question, applies only to mothers and children, aged, infirm and crippled persons who normally live in the London evacuation areas and in certain specified coastal towns and make thier own arrangements to be received in a reception or a neutral area. In all other evacuation areas certificates for billeting may be issued to mothers with children under five who make their own arrangements to be received in a reception area. They can take their older children with them. The position in all the evacuation areas will continue to be constantly reviewed in the light of the current situation.

Nurses at Rest Centres

Captain G. S. ELLISTON asked the Minister if he had considered the need for attendance of trained nurses at emergency rest centres and public air-raid shelters; and what action was contemplated.—Mr. MACDONALD replied: I have arranged, with the coöperation of the London County Council and the metropolitan boroughs, for the attendance of a trained nurse or other person of appropriate experience at all emergency rest centres, and am now taking similar action regarding large air-raid shelters in London.

Doctors' Attendance at First-aid Posts

Sir WILLIAM JENKINS asked the Minister whether he was aware that it had been not unusual for doctors attached to first-aid posts to report at those posts even on a preliminary warning of an air-raid, as well as on occasions when a public warning had been given which did not result in bombing or casualties; whether, as each such attendance involved the state in a payment of 1½ guineas in addition to a retaining fee of £70 in an A area, and 21 guineas in other areas, he would state the cost involved in the first six months of the year 1940; and whether he would consider some reduction in this cost, in view of the fact that so many A.R.P. volunteers rendered services who were called out for duty, and did so without any remuneration.—Mr. MACDONALD replied: I am not aware that doctors have usually reported at first-aid posts as stated in the first part of the question. Doctors should not receive payments in addition to any retaining fees, except for attendance at first-aid posts when summoned from the control centre, and at mobile units whenever a public warning is sounded. The position in regard to mobile units is under reconsideration. The figure of cost involved in the chargeable attendances is not available as a separate item for the period mentioned.

Doctor Detained

Sir ERNEST GRAHAM-LITTLE asked the Home Secretary whether he was aware that a member of the Emergency Medical Service, a fellow of the Royal College of Surgeons of England, had without any warning or reason given been put under arrest in Brixton Prison; and on what grounds this action had been taken.—Mr. HERBERT MORRISON replied: This doctor was detained on Sept. 20 under Defence Regulation 18B as a person of hostile associations and as having been concerned in acts prejudicial to the public safety or the defence of the realm. He has exercised his right of making objections to the advisory committee, who will hear his case as soon as practicable.

Milk for Invalid Children

In reply to a question Mr. BOOTHBY said: The Minister is unable at present to consider the extension of the National Milk Scheme to invalid children of school-age not attending school.

EAR PLUGS

Mr. H. N. G. Cobbe, M.Inst.M.M., writes to correct the impression created by our annotation of Oct. 12 (p. 459) that there is a similarity, both in appearance and function, between the Mallock-Armstrong Ear Defender and the rubber ear-plugs now being distributed to the public. For the latter, he says, no claim is made that they give any protection to the ear against damage; whereas the former has been proved many times in its 25 years of existence to give almost complete immunity from damage caused by a sudden rise in air-pressure in the vicinity of the ear. This is achieved by a sensitive diaphragm in the base of the defender, held between but out of contact with two fine wire screens. The diaphragm is free to vibrate within the limits imposed by the screens, and can therefore pick up and pass on to the ear all ordinary sounds of low intensity without diminution of volume. If there is a heavy explosion nearby the consequent blast forces the diaphragm inwards against the screen where it stops, so preventing any increase of pressure reaching the tympanic membrane. The defender thus obviates any possibility of a ruptured eardrum.

Mr. Cobbe also points out that the highly polished surface of the Mallock-Armstrong defender can easily be cleaned with a handkerchief, whereas the rubber plugs are semi-adhesive and would have to be frequently washed to ensure cleanliness. The defender's bulbous head obtains a firm grip in the canal, and when a proper size is chosen completely prevents any leakage of air. The greatest diameter of the Government plug is equal to that of the No. 2 defender, and since many people require larger sizes it is, he suggests, hard to see how they will obtain a satisfactory fit with the official plug.

The following new categories of interned Germans and Austrians eligible for release have now been added to the official list:—

Persons of eminent distinction who have made outstanding contributions to art, science, learning or letters: Students who, at the time of their internment, were pursuing a course of study at a university or technical college, provided that the vice-chancellor of the university or the head of the college certifies that it is desirable that the student should continue his studies at the university or college and that the circumstances are such that a British student would, in similar circumstances, be allowed to continue his studies. Any person as to whom a tribunal, appointed by the Secretary of State for the purpose, reports that he has, since his early childhood, or for at least 20 years, lived continuously, or almost continuously, in the United Kingdom; that he has long severed connexion with his country of nationality; that his interests and associations are British; and that he is friendly towards this country.

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Letters to the Editor

ESPRIT DE CORPS

SIR,—I understand that the stench in a London tube after it has been used for a night is beyond belief. I wonder whether it would be possible to resort to the old-fashioned charcoal to help in this connexion. Its power in abolishing smells is very considerable and has largely been lost sight of. A former chief once told me that he knew a pharmacologist who actually put a dead cat into a charcoal box and kept it in his drawing-room. Periodically he examined the corpse and noted that it underwent complete dissolution, leaving only the skeleton (and I suppose the ligaments), without its having caused any smell in the room. Perhaps his guests were too polite to say anything, or perhaps they just took smells for granted in the house of a professor of pharmacology, but I think it was a valid experiment with considerable significance. Another of his friends (they seem to have had a grim sense of humour in those days) kept a charcoal box in his room and used to pass his urine into it. He pointed out that the porous material took up the fluid, "fixed" the various contents which came out on evaporation, and retained the smell. Though I have not adopted the practices of either of these enterprising fellows I had occasion some months ago to apply the principle of their experiments. I was looking after a woman who had a suppurating knee-joint associated with pyæmia. The smell was appalling, and many of her visitors couldn't stand it. I ordered lumps of charcoal to be prepared about the size of cube sugar. These were put in muslin bags the size of one's fist and slung around the dressings, and several more bags were put in the bed. The procedure was completely successful, and nurse's improvisations, such as bowls of Dettol about the room, were discontinued. I tried to give the impression that it was all in the day's work, but secretly I was greatly astonished at the effectiveness of this old remedy.

Do you think the experts would consider putting thin slabs of charcoal—say 36 by 36 by 2 in.—along the roof of the tube (and other) shelters?

Glasgow. STANLEY ALSTEAD.

DRY DRESSING

SIR,—For some time I have been advocating a dry dressing or no dressing at all in the treatment of wounds which one wishes to heal by so-called first intention. The unpleasant appearance and frequent infection of wounds which are dressed for the first time with a moist compress or left for some time under an air-tight covering should be better appreciated. The wounds I have been seeing lately which have been treated at a first-aid post or elsewhere have provided striking proof of the value of the dry dressing. Some multiple abrasions or lacerations have defied the ingenuity of the dressing stations to cover them entirely, and the healthy appearance of the uncovered wounds contrasts so markedly with the moist white unhealthy appearance of the enclosed wounds that no-one would hesitate in choosing which was the more effective method. The enclosed wounds are usually covered with a compress of acriflavine and water, or sealed over with strapping, sometimes alone but more often over gauze, whereas I am convinced that the best dressing of a wound for the first time, after preliminary cleaning, and certainly if cleaning is to be left to the casualty clearing station, is a dry gauze or gamgee pad.

Moisture washes dirt into the wound, prevents the rapid clotting of blood (hindered still more by antiseptics), provides a warm, moist nidus for bacterial multiplication, and produces sodden white unhealthy wound edges. We have progressed so far in our treatment of serious war injuries that, after offering what assistance we can in the removal of debris, we leave the rest to nature; in less serious wounds this principle should be borne in mind, and nature's efforts should not be hindered by the use of watery antiseptics in the first twenty-four hours. Other solutions, such as dilute iodine or Dettol cream, have not the same objections; though they have their drawbacks they are sometimes extremely useful. Of course once infection is established, or granulation tissue present, the objections to the use of water do not apply. The important thing is, during the first 24–48 hours, to avoid water, and—what amounts to the same thing—to avoid the air-tight enclosure of a wound so that it becomes sodden from skin sweat.

Hammersmith, W.6. J. G. BONNIN.

E.M.S. SALARIES—AND OTHER THINGS

SIR,—Mr. Maxwell Ellis has misapprehended the steps which are likely to be taken with regard to the E.M.S. There is no intention to restore the voluntary system which is what I asked for a year ago; all that is contemplated is to make certain changes in the methods of remuneration. I may mention in passing that Mr. Ellis is more fortunate than many of his colleagues in that he will, if he remains in the E.M.S. and the changes foreshadowed by the select committee are put into operation, receive sessional payment and surely the value of this would depend upon the frequency of the "occasions" for which payment may be claimed. The sorry plight in which the profession now finds itself is, I submit, the direct result of the disastrous and senseless measures taken at the outset of war by the Ministry of Health, measures which, to repeat Wilfred Trotter's apt description, bore "the diagnostic marks of having been affected by panic," and which "half-paralysed" medical practice in London.

Early in September, 1939, I was bombarding the Minister of Health with parliamentary questions and suggestions to release for part-time service the staffs of the voluntary hospitals, seven-eighths of whom had been for practical purposes "conscripted" before the outbreak of war. On Oct. 11 I obtained from the minister the concession that members of the honorary staffs who wished to do so would be accepted for E.M.S. work on a "gentleman's agreement" that they would respond to the call for full-time service when necessity arose, but that in the meantime they would be completely free to continue their peace-time obligations. I obtained the minister's permission to read the letter in which this offer was made at the meeting of the Royal College of Physicians on Oct. 12, but by this time the ministry had largely forfeited the confidence at any rate of the consulting section of the profession, and the offer received only negligible support.

I gave as objective an analysis as I could of the report of the select committee on the E.M.S. for its first year of work. Naturally that report would not in any way deal with the question Mr. Ellis raises—namely, the transfer of redundant E.M.S. officers to the R.A.M.C. How far the recent developments of the crisis may modify the recommendations of the select committee it is not possible to foresee.

This leads me to refer to another subject, suggested by a leader in your issue of Oct. 12 on tetanus immunisation on the home front. Before I saw this I had put down a question asking the Minister of Health to make provision for tetanus immunisation of members of the Home Guard, and I have just received an answer from the Secretary of State for War announcing that this is under consideration by the Government. I understand it would make things much easier if the medical profession would undertake the administration of the required injections free of charge, the material being supplied by the Government. As members of the Home Guard are themselves giving their services without payment it would, I submit, be a graceful gesture for the profession to make. Here then is an opportunity to dissipate the boredom complained of by Mr. Maxwell Ellis which I hope, and feel sure, the medical profession will gladly accept.

Wimpole Street, W.1. E. GRAHAM LITTLE.

TYPHOID ABSCESS TREATED WITH SULPHAPYRIDINE

SIR,—A patient of mine contracted severe enteric fever in November, 1932. In March, 1934, he developed acute pain in the upper part of the right tibia with much local tenderness and swelling. After a few days I incised the periosteum, giving exit to a little fluid, and he remained free from symptoms until January, 1940, when they recurred. I gave him a course of M. & B. 693

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and within a week all symptoms had disappeared, but they appeared again in September. A further course of M. & B. 693 had no effect. I opened the affected area and found the bone like ivory; by cutting away the overlying bone I disclosed a channel about 1½ in. long, which contained about ʒ ij of thick yellow pus. The walls and floor were like the roof. Examination by the local Pasteur Institute gave a pure culture of one of the Eberth-paratyphoid group. Packing was removed after 24 hours and not reintroduced. Rapid healing followed.

English Clinic, Tangier. F. J. W. PORTER.

DEATH AND DYING

SIR,—Dr. Ryle throws aside all but "the motor and sensory activities of life," limiting them to "the structures which subserve life," dissolution of which will leave nothing by which to "move and feel in the way that we have been accustomed to move and feel." Does he seriously contend that our whole being, body and soul, is limited to the narrow range of human vision, hearing, touch and smell? What vestige of evidence has Dr. Ryle that will and choice, love and hatred, reproduction, creation and life are dependent on "the structures which subserve life" and are dissolved at death? I say, in the bare spirit of scientific, physiological and psychological truth: none whatever. Dr. Ryle's view of death is a naked materialism, a shallow paganism, totally out of step with our universities. It is not, of course, the view of the great mass of mankind; it is not the view of the philosophers; it is not, surely, the common view of general medical practice. It can only be put forward by men whose outlook is confined to the narrow limits of "natural" science, neglecting the dominating rule of the spirit, with its all-permeating activity of which we have the most certain evidence, describable only by analogy and symbol. The medical profession, if un-ecclesiastical, is and must always be religious at heart and convinced of an after-life, offering a nobler view of death than the complete wash-out and annihilation which is all the comfort Dr. Ryle's dismal paganism has to offer.

Hatfield, Herts. FRANCIS FREMANTLE.

SIR,—Professor Ryle has based his thesis upon his own experience and one listens to him with the attention that his keen observation and clear induction always command. But as well as his observations of those dying he has also given us certain statements about death—statements made as fact, although he says that men have no chance to leave records and in consequence he can have no autobiographies of death, as opposed to dying, upon which to base his statements. His statements about death are:

(1) That it is a peace supplied by oblivion.

(2) That it is an oblivion not different from that of the fœtus in utero.

(3) That "those whose lives are compounded of action and a faith in mutual aid need know no death."

(4) That those in the same category as under (3) will know no terror and no shame while dying.

and he bases them upon the following argument:

(1) All sensory and emotional activities of human beings depend upon the functional integrity of the exquisitely delicate material body.

As far as we can observe here and now this appears to be true.

(2) So "elaborate and perfect" is this body that we cannot conceive the disintegrating body as experiencing these activities.

I must agree.

(3) The stimuli normally provoking these activities in a living body evoke no response from a dead one—

Agreed observed fact.

(4) We cannot believe that any other part of us remains to feel and move in the way that we have been accustomed to feel and move if the structure subserving life is disintegrated and motor and sensory activity ceased in consequence. If the body is dead and its activity ceased we cannot believe as logical and scientific beings that anything remains to feel and move as the body did when it was alive.

I am uncertain whether Dr. Ryle means (*a*) that we have no logical or scientific grounds for the belief in something remaining; or (*b*) that if we are logicians or scientists we cannot believe that anything remains. In the former case I agree there are no scientific grounds for the belief but he advances no logical grounds for belief or unbelief—his argument has been purely physical and not metaphysical. In the latter case I must simply respectfully disagree.

(5) For us ("logical and scientific beings" and "rationalists") death *must* mean arrest of activity—i.e., sensation, thought and motion as we now understand it and oblivion as in utero.

(6) This arrest and oblivion must be so even if there be a spirit separate from sensation, thought and motion as we understand it.

In these points Dr. Ryle claims that for us as logical, rational and scientific beings (*a*) death must mean cessation of all life as we know it, and (*b*) even if there should remain a spirit separate from life as we know it—at least a hypothetical concession to the complete argument—then "it," although "it" has ex-hypothesi potentialities surviving bodily death, must still be condemned for certain to an oblivion—i.e., to a state of forgetting or having forgotten or to the condition of being forgotten (both meanings allowed by the New Oxford Dictionary)—and this forgetting or forgotten state "not different from that which obtained before we left the womb."

Now first, if there is not a spirit separate from and surviving bodily activity then (*a*) the fœtus is only a fœtus and no part of it has any previous state to forget, (*b*) the peace of oblivion has no meaning, for peace is a state and to be felt demands a sentient self-conscious being to feel it. Equally "forgetfulness" or "forgotten" implies state or being or it has no meaning. Without the, in some way, sentient survivor all the dead are on a flat level of annihilation.

Secondly, if there is a spirit, Dr. Ryle says that it is in a state of intra-uterine oblivion. This presumably means a forgetfulness of what has gone before—implying at least that the "it" in the fœtus had a conscious existence before incorporation, for he cannot mean simply that it forgets what happens from moment to moment. The physical machinery subserving mind is in becoming during gestation and I submit that it is as far beyond any scientific observer to say when a human being starts using (not displaying) the rudiments of memory as it is impossible for a scientist to make observations of the state after death. The thing is simply not within the reach of his material senses.

Again the "it" incorporated in the fœtus has all its functions in potentiality—not used. The "it" after death is necessarily as different as fulfilment must be from potentiality though for each individual in varying degree; yet Dr. Ryle would deny the survivor any memory because that which subserved thought when the "it" was in corpore no longer exists. I have shown that a sentient self-conscious survivor is necessary even to his own statements about death and he can, in the nature of things, know nothing scientifically of the state of the survivor and the apparatus subserving its functions.

As scientists, therefore, we can have nothing to say about the after-death state of any possible immortal part of us. As rational and logical beings, however, we can say a great deal—i.e., as metaphysicians but not as scientists. Here I cannot but feel that Dr. Ryle himself has invented an idea with neither scientific nor logical evidence in support and pressed it as the only reasonable belief on scientific grounds. Further to discredit other beliefs about death associated with "conventional religious influence" religion and superstition have been bracketed and the same statements made to apply to both so that in the reading they appear synonymous. Finally the suggestion of the bribe of wings, haloes and harps is surely too simple an Aunt Sally to be put up as a fair example of the idea of existence after bodily death which religion has to offer.

This is not the place to offer the evidence that others are prepared to accept about the state after death. Certainly we have no need to fear it, but not for Dr. Ryle's reasons. I have left untouched the question as to whether the survivor feels or moves as he was accustomed to feel and move here in favour of major issues. For the same reason and because his meaning is not clear to me I have not commented upon his third and fourth attributes of death.

Edgware, Middlesex. F. HARWOOD STEVENSON.

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Obituary

HENRY HEAD

K.T., M.D. CAMB., F.R.C.P., F.R.S.

Henry Head lived a life crowded with careful observation and with constructive and adventurous experiment. He was born of a Quaker family 79 years ago at Stamford Hill; his father was a member of Lloyds. He died at Reading on Oct. 8. As a boy he gained a science scholarship at Charterhouse and on leaving school was elected to a scholarship at Trinity College, Cambridge, of which he later became an honorary fellow. He took a first-class in the natural sciences tripos and then went abroad for a time to the University of Prague. His medical training was completed at University College Hospital; he qualified in 1890 and took his M.A. and M.D. at Cambridge in 1892. His M.D. thesis on disturbances of sensation with special reference to the pain of visceral disease was extended later and published in *Brain* in 1893, 1894, and 1896. This piece of work established "Head's areas"—the regions of increased cutaneous sensitiveness associated with diseases of the viscera. Later he was his own subject in an experiment on section of cutaneous nerves, from the results of which he elaborated the conceptions of protopathic and epicritic sensibility. He also investigated, with Gordon Holmes, the path of afferent impulses in brain-stem and thalamus, and of function in the receptive areas of the cortex. After qualifying he had held house appointments at U.C.H. and Victoria Park; he also worked for a time as clinical assistant at Rainhill County Asylum, continuing his neurological studies. He became registrar at the London Hospital, and subsequently, in 1896, assistant physician. In 1899 he was elected a Fellow of the Royal Society, receiving the Royal Medal in 1908; he delivered the Society's Croonian lecture in 1921. He became a member of the Royal College of Physicians in 1894 and a Fellow in 1900, and delivered the Goulstonian lecture of the College in 1901 on mental symptoms associated with visceral disease, and the Croonian lectures in 1911 on sensory disturbances from cerebral lesions. He was awarded the Moxon Medal of the College in 1897 and, in 1903, the Marshall Hall prize of the Royal Medical and Chirurgical Society for work "adjudged to be pre-eminent for its originality." During the last war he gave up private practice and, living at the hospital, devoted his whole time to the soldiers admitted there. Dr. George Riddoch, recalling him at this period, tells of his stimulating enthusiasm, his tolerance of youthful extravagance provided it was tempered by intelligence, and his capacity for work. But a few years saw the onset of Parkinson's disease which slowly encroached on his activities; with great practical address he planned his life ahead to circumvent his growing disability. He at least had the knowledge that his mind would remain unimpaired and he kept alive his wide interests in science, literature, music and human affairs. Mr. Robert Nichols (*Times*, Oct. 15) remembers him as a conversationalist who could talk with knowledge in the course of an evening on the influence of reasoning on Goethe and Mozart, apprehension in listeners to symphonic music, looping the loop, co-ordination in a golfer, Ninon de Lenclos, Conrad, religious ecstasy, and social customs in Melanesia. He wrote much, not only scientific work, but verse and translations of verse from the German. From 1910–25 he edited *Brain*. His wife was the daughter of Mr. A. L. Mayhew of Wadham College, Oxford. She died last year; they leave no children.

Elliott & Fry

Sir Charles Sherrington writes: "The retirement, owing to ill-health, of Henry Head from active work some years ago fell like a shadow across neurology; and now his death comes as more than a reminder of that loss. Qualities of knowledge and of character united in him to make an inspiring and loved figure, both as to fellowship and leadership. He had attained a great position and an influence which far from remaining static was growing and dynamic for those who pursued his subject. Of ways in which he was exceptional one, we may think, was that, though in our time it is evident enough that the ward and the laboratory offer for scientific study a certain aspect entirely in common, it yet is given to few, as it was given to Head, to use the one as competently as the other. His enthusiasm for inquiry, his tireless industry, and his breadth of view accompanied his mastery of both.

"His earlier career established him as a worker of distinction in physiology and in psycho-physiology. Later the clinic with its directly human problems, and particularly those of neurology, appealed to him irresistibly. There ultimately, both as investigator and teacher, his career reached its fulfilment. Among his themes of predilection two, the referred pains of visceral disease ['Head's areas'] and disturbances of speech accompanying disease of the brain, carry his name with them wherever they are studied. Characteristic of him was that no problem ever deterred him by its size. Extensive problem as was that of the pains accompanying visceral disease, he made of his inquiry into it a comprehensive and systematic survey of its entire field. I remember how his case-boxes—for he used haberdashers' boxes to keep his case-notes—filled shelf upon shelf. With his investigation the subject entered a fresh phase. The other of the two themes above-mentioned was of still wider venue and with yet more intricate ramifications on another plane. His work upon it was finally issued, collected in two volumes, fourteen years ago. It had of course philosophical as well as more purely medical bearings, and I well remember hearing the late Professor Alexander speak in admiration of its originality and power. Aphasia is a subject on which not a few great reputations have foundered, but Head's contribution touched firmer ground and marshalled broader facts.

"He had vivid loyalties, and in science an abiding one of them was to his Cambridge teacher, Dr. Gaskell. Again, to the genius of Hughlings Jackson his tribute, manifold and personal, amounted almost to a feature of his writings. As a teacher he had himself a wide and devoted following. In his lecturing some slight mannerisms endeared themselves to his audience as very symbols of him. After his retirement not a few eminent visitors from abroad made his retreat a place of pilgrimage to offer him their admiration and affection—among those who on more than one occasion did so may be mentioned the late Dr. Harvey Cushing of Yale."

PROFESSOR BIELSCHOWSKY

Max Bielschowsky, who died in London on August 18 in his 72nd year, was known to all neurologists and histologists from the staining method for neurofibrils which he devised in 1902 and which has largely replaced the method of Cajal on which it was based. It was indeed the foundation for the methods by which Del Rio Hortega and his pupils have illumined the neuroglia and microglia. Most of Bielschowsky's working life was spent at the Kaiser Wilhelm Institute for brain research in Berlin, where he patiently investigated the pathology of diseases of the brain, especially amaurotic family idiocy and tuberous sclerosis. When a pupil of Edinger at Frankfurt a/M. he came under the influence of Nissl, and his writings were always informed with the clear conception of neuronal structure in health and disease which Nissl established. The short chapter which Bielschowsky wrote in Penfield's Cytology of the Nervous System on the histopathology of nerve-cells sums up Nissl's teaching and includes much of his own original work. After his exile in Holland he published a masterly statement of present-day knowledge on the general histology and histopathology of the nervous system in Bumke-Foerster's Handbuch der Neurologie.

Something both of the artist and the philosopher was seen in Bielschowsky's writings. They were always beautifully illustrated, and in his discussions of cause and effect he always strove for a unifying conception of

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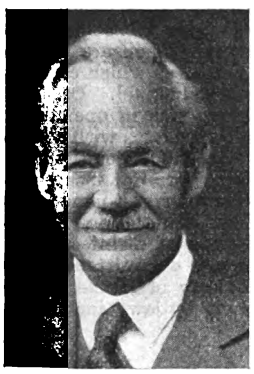
the processes of disease in the nervous system, without however bringing to his aid such vague generalisations as Vogt's pathoclisis. He will be missed both as a master of his craft and as a single-minded searcher after knowledge.

WILFRED GRENFELL

K.C.M.G., M.D. OXFD, F.R.C.S.

COMPARATIVELY few men leave their stamp so clearly on the scenes of their deeds that they achieve a natural title; Grenfell of Labrador was one of these. He died in his home at Charlotte, Vermont, on Oct. 11 at the age of 75. He was born at Parkgate, near Chester, and spent his boyhood on the Sands of Dee "simply messing about in boats"—a hobby which had a value for many people later in his life. He took a scholarship at Marlborough and there his tastes included chemistry, mathematics and boxing. After a term at Oxford, during which he played football for the university, he trained in medicine at the London Hospital, and was secretary in succession to London University cricket, football and rowing clubs. One night he went into a tent at Shadwell and came out so much moved by the evangelism of Dwight Moody that his sturdy Christianity took a practical turn which coloured all his later actions. He qualified in 1886 and visited the North Sea fishing fleet as a member of the Mission to Deep Sea Fishermen. Like Treves, his teacher at the London, he held a master mariner's certificate, and when he was invited to inquire into the physical and spiritual needs of the fishermen in the north-west Atlantic he gladly undertook to do it. He sailed across, in 1892, in a small ketch-rigged hospital ship. When he got to St. John's in Newfoundland it happened to be on fire for the third time in its history. Sailing along the coast of Labrador, he put into the coastal ports of the Hudson Bay Company and treated some 900 patients. He found in all between fifteen and twenty thousand white fishermen, Indians and Eskimos living under conditions of great hardship; no hospitals were available to them and little chance of help when they were sick. When he retired in 1934 the Grenfell Association was responsible for five hospitals, seven nursing stations, two orphanages, fourteen industrial centres, four summer schools, three agricultural stations, twelve clothing distribution centres, four hospital ships, one supply schooner, twelve community centres, a cöoperative lumber mill and a haul-up slip for ship repairs—no mean record for one life's work.



Russell, London

His practice during fifty-eight years covered the coasts of Newfoundland and Labrador; his patients were poor honest men living by fishing, furring and sealing. He began by attacking disease; one small hospital made the first link in the chain of five, and then he began to found schools and orphanages, to establish fox farms and sawmills. His schemes exceeded the means of his mission, so he started lecture tours in Britain and America, and as result the International Grenfell Association was founded, with an endowment of £200,000. He had a great belief in the resources of Labrador—the rich forests of spruce, fir and poplar ready for paper making, the mineral ores, the water power, the abundance of cod, salmon and reindeer. He thought, too, that tourists, once introduced to the beauties of that coast, would visit its fjords and rivers as keenly as they do those of Norway, and in 1934 two tourist steamers visited the coast. He saw Labrador as important in an Imperial air system. Young men and women sent by the association to train in Canada and the United States returned to work among their own people, and volunteers from all over the world came to help him as doctors, nurses and teachers. During the last war he was a major in Harvard's surgical unit at Boulogne.

His honours were many. In 1927 he was made a K.C.M.G., and in the next year was elected Lord Rector of St. Andrews University; Oxford made him her first honorary M.D.; St. Andrews, McGill, Toronto, Harvard, Princeton and several other universities conferred honorary degrees upon him. He received the Murchison grant of the Royal Geographical Society, the Livingston gold medal of the Royal Scottish Geographical Society, and the gold medal of the National Academy of Social Sciences of America. He wrote many books, mostly about Labrador. In one of these—"Adventure in an Ice Pan"—he tells how for two freezing days and a night he was marooned on a small ice-floe, clad in scanty wet garments and with seven husky dogs for company—a story of hardihood and resource. He married Miss MacClanahan in 1909; she died in 1938. They leave two sons and a daughter.

DR. ROBERT GRIEVE, who with his wife was killed during an air-raid in the Sudan, was an American member of the Sudan Interior Mission. He graduated B.Sc. from the University of Oregon in 1935, and three years later took his medical qualification at the medical school. For a year he was an interne at the Deaconess Hospital at Spokane, and during this time he passed the state ward examination and was licensed to practice in the state of Washington. Dr. and Mrs. Grieve sailed from New York for the Sudan last October and in January they were appointed to the mission station at Doro, some 500 miles south of Khartoum. There they worked among the Maban people, a primitive tribe hitherto unreached by missionary effort. Dr. T. A. Lambie, field director of the mission, writes that Dr. and Mrs. Grieve were steadily winning the confidence of the people and had already persuaded a number to submit to necessary operations.

MAJOR WILFRED BURNET FARIS ORR, who died at Llandudno on June 28, had served in France from the beginning of the war and took part in the evacuation of Dunkirk. He was born in 1899, the son of the late Dr. James Orr of Templepatrick, co. Antrim. He graduated M.B. from the Queen's University, Belfast in 1921 and obtained a commission in the R.A.M.C. in 1923. He was promoted captain in 1927 and major in 1934. He took his D.P.H. in 1927 and in 1931 he was awarded the Leishman silver medal and the Parkes memorial bronze medal.

Appointments

BOUCHER, H. B., M.B. Lond., F.R.C.S.E., D.T.M. & H.: temp. asst. M.O.H. for Plymouth.

BRIGGS, G. O. A., M.B. Camb., M.R.C.P., D.P.H.: medical superintendent of Nottingham's new sanatorium.

TREE, MARK, M.B. Lond., F.R.C.S., D.O.M.S.: surgical registrar at the Birmingham and Midland Eye Hospital.

WALKER, J. V., M.D. Birm., M.R.C.P., D.P.H.: M.O.H. and school M.O. for Ramsgate.

WILLIAMSON, H. C., M.B. Belf., D.P.H.: asst. M.O.H. for Oldbury.

Births, Marriages and Deaths

BIRTHS

MILES.—On Oct. 13, at Tiverton, the wife of Surgeon Lieut.-Commander T. F. Miles, R.N.—a daughter.

SPICER.—On Oct. 13, at Drayton, Norwich, the wife of Dr. E. R. Spicer—a son.

MARRIAGES

BOLTON—POWELL.—On Saturday, Oct. 19, Robert H. Bolton, M.D., to Felicity Powell Pearson.

WILLIAMS—RIDGERS.—On Oct. 12, at Cleeve Hill, Gloucestershire, Bryan Williams, F.R.C.S.E., to Marjorie Ellen Ridgers.

DEATHS

BUCKLEY.—In October, as the result of enemy action, Leonard Buckley, M.B. Lpool, major R.A.M.C., of Wincanton, Somerset, and Liverpool, aged 54.

BURGESS.—On Oct. 18, Norman Francis Clifford Burgess, M.D. Camb., M.R.C.P., of Bristol.

PLATT.—On Oct. 13, at Hampstead, Kate Anne Platt, M.D. Lond., first principal of the Lady Hardinge Medical College, Delhi.

SANDERS GREEN.—On Oct. 14, Algernon Sanders Green, M.B. Lond., of Great Witley, Worcestershire, aged 46.

SCHOLBERG.—On Oct. 14, at Lisvane, Cardiff, Harold Alfred Scholberg, M.B. Lond., D.P.H.

WATKINS.—On Oct. 14, Arthur Muriel Watkins, M.R.C.S., of Fleet, Hants, and late of Whitchurch, Salop.

WHITE.—On Oct. 12, as a result of enemy action, Charles Francis White, M.B. R.U.I., lieut.-colonel R.A.M.C. (retd.), aged 61.

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Medical News

University of Cambridge

During the absence of Prof. John Ryle on national service Dr. R. A. McCance has been appointed to act as head of the department of medicine.

Royal College of Surgeons of England

On Oct. 21 and 23 at 3 P.M. Dr. John Beattie will deliver two Arris and Gale lectures on hæmorrhage. On Oct. 30 and Nov. 5th he will speak on fluid therapy. All the lectures will be given at 1, Wimpole Street, London, W.1 at 3 P.M. They are open to medical practitioners and advanced students.

The museum demonstrations which were to have been held on Mondays and Fridays during October have been cancelled.

Royal College of Surgeons of Edinburgh

At the annual meeting of the college held on Oct. 16, the following office-bearers were elected for the ensuing year:—

President, Dr. H. M. Traquair; vice-president, Mr. W. J. Stuart; secretary and treasurer, Mr. J. W. Struthers; members of the president's council, Mr. James M. Graham, Prof. R. W. Johnstone, Sir John Fraser, Mr. A. Pirie Watson, Dr. G. Ewart Martin, and Mr. Francis E. Jardine; representative on the General Medical Council, Mr. Alexander Miles; convener of museum committee, Mr. W. Quarry Wood; and librarian, Dr. Douglas Guthrie.

At a meeting of the college held recently, with Dr. H. M. Traquair, the president in the chair, the following were admitted to the fellowship:—

Segulla Aptekar, M.B. Bombay; J. J. Commerell, M.B. Cape Town; L. G. Cruickshank, L.R.C.P.E.; G. F. Dommisse, M.B. Cape Town; B. W. Goldstone, M.B. Lond.; J. L. Griffith, M.B. Camb.; S. P. Gupta, M.B. Lucknow; Kathleen M. D. Harding, M.D. Lond.; R. N. Houlding, M.B. Lond.; C. L. O. Macalister, M.B. St. And.; K. C. McKeown, M.B. Belf.; A. I. S. Macpherson, M.B. Edin.; C. R. Palfreyman, M.B. Melb.; A. R. Parkes, M.B. Edin.; L. H. A. Phillips, M.B. Sydney; J. L. D. Scott, M.B. Sydney; H. O. Smith, M.D. Ontario; W. J. Watt, M.B. Cape Town; A. W. Wilkinson, M.B. Edin.; and M. O. Youssef, M.B. Cairo.

University of Glasgow

On Oct. 19 the following degrees were conferred:—

M.D.—L. D. W. Scott (with high commendation); and Robert Cameron.

Ch.M.—E. W. Grahame.

Service Casualties

The following R.A.M.C. officers are reported to be prisoners of war:—

Lieutenant G. D. Cribb, M.R.C.S., A./Major W. M. MacLeod, M.B. Lond., Lieutenant H. Rosenberg, M.R.C.S., Lieutenant A. Taylor-Smith, M.B. Edin., Lieutenant R. F. K. Webster, L.R.C.P.E. and Lieut.-Colonel T. H. Wilson, F.R.C.S.

Royal Air Force

The following promotions in the medical branch are announced:—

Air-Commodores to be Air Vice-Marshals (temporary): William Tyrrell, M.B. Belf. and H. E. Whittingham, F.R.C.P.

Group-Captains to be Air-Commodores (temporary): W. A. S. Duck, M.R.C.S., A. E. Panter, M.R.C.S., Andrew Grant, M.B. Edin.

Health in the Shelter

On Oct. 5 Sir Arthur MacNalty, with other officers of the Ministry of Health and representatives of the Ministry of Home Security and the Department of Health for Scotland, met the medical officers of health of the metropolitan boroughs to discuss measures for the prevention of epidemic and other disease in rest centres and air-raid shelters. Lord Horder and Dr. Allen Daley of the London County Council were also present. Sir George Chrystal, who took the chair, explained that the primary responsibility for the control and management of shelters belonged to the Ministry of Home Security but the Ministry of Health had great interest in and responsibility for matters affecting public health. Lord Horder's committee had made recommendations which were necessarily in general terms. As regards rest centres, Dr. Daley explained that the L.C.C. were providing doctors and nurses, sick bays and drugs at the centres on behalf of the Ministry of Health. The beds available for the chronic sick had been greatly reduced but hospital provision was being made for them. People were staying too long in the rest centres and local authorities should be pressed to expedite the provision of billets and the emergency repairs to houses. It was generally agreed that it was impossible to prevent persons suffering from infectious disease entering shelters, and a suggestion of some form of cursory inspection at the entrance was rejected. The real solution consisted in reducing the numbers using the shelters by evacuation of the population to less crowded parts of the country. There was some diversity of opinion as to whether the provision of bunks would necessarily reduce the number of people using the shelters. Various suggestions put forward in a report by Dr. Maitland Radford (St. Pancras) were received with approval and the meeting was informed that the question of payment for the medical and nursing work involved was under urgent consideration by the Ministry of Home Security. The desirability of compulsory inoculation against diphtheria and typhoid was discussed. It was agreed that it would be very difficult to arrange for a doctor to be in continuous attendance in the shelters, except possibly in very large ones, but some scheme should be worked out in each borough to ensure that the services of a doctor were available for cases which could not be dealt with by nursing and first-aid personnel. Dr. James Fenton described such a scheme which was in operation in Kensington. The provision of red-cross nurses with a home-nursing training should be possible and the difficulties in the way of providing some sick-bay space were not insuperable. The prevalence of nasopharyngitis was referred to and scabies of a septic type was recorded from one area. Lord Horder's committee was considering the question of disinfection and disinfestation with the aid of expert committees of the Medical Research Council. The Ministry of Home Security was devising a code of good conduct by-laws for shelters, which would shortly be issued.

Middlesex Hospital

The pre-clinical students of this hospital have gone to the University of Leeds, where, by the courtesy of the vice-chancellor, they will be taught by their own professors for the London degree in medicine, and for the examinations of the Conjoint Board and other examining authorities. Most of the clinical students are still at the Middlesex Hospital, but owing to the lack of clinical material some are attached to Tindal House Emergency Hospital, Aylesbury, and Mount Vernon Hospital, Northwood. The students will be moved between these three hospitals according to the stage of their studies. The school has not been "evacuated," but the students have been attached to hospitals where the greatest clinical facilities are available.

Civil Defence Award

Dr. Elsie Burns, principal resident medical officer at the Liverpool City Isolation Hospitals, has been brought to notice for good service in connexion with civil defence.

The section of odontology of the ROYAL SOCIETY OF MEDICINE will meet on Monday, Oct. 28 at 3 P.M., at 1, Wimpole Street, W.1, when Dr. Evelyn Sprawson will deliver his presidential address. He will speak on forensic aspects of the teeth and jaws. On Wednesday, Nov. 6 at 2.30 P.M., the sections of surgery and therapeutics will discuss the treatment of burns.

A meeting of the MEDICAL SOCIETY OF LONDON will be held on Monday, Oct. 28 at 3 P.M., at 11, Chandos Street, W.1, when Colonel Max Page, Colonel Leonard Colebrook and Mr. W. H. Ogilvie will open a discussion on the chemotherapy of war wounds.

Lady Mackenzie, M.B., widow of Sir Colin Mackenzie, who holds an honorary administrative post at Australian Army headquarters, has been appointed a captain in the reserve of the Australian Army Medical Corps.

Colonel Hugh Richardson, M.D., has been appointed a temporary assistant in anatomy in the University of St. Andrews.

The time of attendance for out-patients at the National Hospital, Queen Square, has been changed from 1 P.M. to 11 A.M. The time for admission of inpatients remains unaltered.

MESSRS. T. J. SMITH & NEPHEW (Hull) are supplying their Cellona in widths of 18 in., 24 in., and 36 in. for use in the "closed" treatment of wounds. The plaster is supplied in rolls on card cores and is wrapped in grease-proof paper. Cellona is also available in the following sizes: 6 in. by 4 yd., 8 in. by 4 yd., 4 in. by 6 yd., 6 in by 6 yd., and 8 in. by 6 yd.

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ORIGINAL ARTICLES

THE MOYNIHAN TRADITION[1]

BY GORDON GORDON-TAYLOR, O.B.E., M.A. Aberd., M.S., B.Sc. Lond., F.R.C.S., F.R.A.C.S.

SENIOR SURGEON TO MIDDLESEX HOSPITAL; TEMPORARY SURGEON REAR-ADMIRAL

IT is appropriate that here in Leeds, close to the General Infirmary with its wealth of surgical tradition dating a hundred years before the birth of its greatest son, I should say something of the distinguished founder of this lectureship, trying to recall, if only for a short space of time, this great surgical shade before the eyes of those who knew him, and endeavouring on behalf of those of immature years to invest a great legendary name with some panoply of his vital attributes—his transcendental surgical skill, his superb literary gifts, his oratorical powers and personal magnetism.

This lectureship was founded by the first Lord Moynihan in memory of his mother, Ellen Anne Moynihan, who was indeed responsible for his final reluctant decision to abandon an army career and devote himself to surgery. He came of a military family; his father, Andrew Moynihan, at the storming of the Redan in the Crimean War had gained one of the earliest Victoria Crosses and had subsequently received a commission from the ranks—a rare distinction a century ago. It is said that no fewer than five Moynihans fell at the battle of Malplaquet in 1709, and his own paternal grandfather, Malachi Moynihan, had also been a soldier. His name bespoke his Irish descent, for his paternal forbears hailed from Templemore in Tipperary. The proud possession in the Moynihan family of a V.C. ensured for the gallant father a permanent niche in the temple of fame, and Moynihan himself religiously observed the anniversary of this *dies dierum* on which the Victoria Cross had been won.

It is idle to speculate upon the reasons which determined him to found this lectureship in his mother's memory, but it is incumbent on me to refer to his affection for her; he would have wished this. The courage of his mother in her widowhood doubtless appealed to Moynihan, but it was probably the realisation, not bruited from the housetop, that he owed everything to her that determined him to commemorate her name in this lecture.

The following letter, written in 1929 to the present and second Lord Moynihan, reveals the depths of his affection for her:

"The greatest regret I have is that you could not know my mother, the most beautiful, kindest, most lovable mother in the world. You would have loved each other and you would have learned much from her. She was the gentlest, sweetest, most considerate of people. I never heard her say an uncharitable thing of anyone; she never did an unkind act; and at immense sacrifice she gave me my chance. She was terribly poor, and my education was more than she could afford; but she denied herself everything for me. And she showered love on me and helped me so gently and tenderly in every possible way. It was her influence that made me want to work and to succeed for my son, as she had laboured and sacrificed for me, so you see, my son, it is to her that I owe everything."

* * *

Berkeley Moynihan was born in Malta on Oct. 2, 1865. His schooling was uneventful and at his kindergarten and at Christ's Hospital he achieved nothing of note. His athletic interests were first kindled at the Royal Naval School, then at New Cross, and he acquired some schoolboy repute in swimming and in football. But his undergraduate days in the medical school of Yorkshire College, Leeds, were spent in hard work; poverty permitted no indulgence in pleasures; the years of studentship were crowned with academic success, and prizes in nearly every subject except surgery rewarded his industry. His subsequent rise to surgical fame and the brilliance of his career are well known to all surgeons in Great Britain. He has been indubitably the greatest surgical figure of the first half of the twentieth century, and the name of Moynihan and the Moynihan tradition constitute a surgical asset—a possession for all time, not merely for Leeds; not only of the surgery of Britain, but of the whole British Empire.

In these days of vigorous traumatic surgery the gentleness which Moynihan displayed and taught, and for which his name stands, may possibly be forgotten or relegated to the background. Doubtless there will remain surgeons, when peace comes, who are still outraged at the spectacle of forcible retraction in the upper zone of the abdomen. The self-retaining retractor may be a useful expedient, or even an essential, for certain operations on the less vulnerable, less remonstrative, region of the pelvis; in the upper abdomen a self-retaining retractor is anathema to operators trained in a school of surgical gentleness. Moynihan was never tired of impressing upon surgical pilgrims and pupils that "every pull is a pain," and the grunt of the anæsthetised patient when, by some automatic contrivance, the edges of a wound in the upper abdomen are suddenly forced apart, betokens the truth of his teaching. The cunning of his fingers and the gentle but firm pressure of the appropriately placed hand of a skilful assistant enabled him to dispense with any contrivance or movement which savoured of vigour. He scorned brute force and himself attained that ideal in surgery of which he often spoke, "the heart of a lion and the hand of a lady." He rarely employed a needle-holder; his natural dexterity enabled him to suture freehand those deep-seated organs which others are wont to repair by means of a mounted or mechanical needle. He did not try to emulate Bland-Sutton whose few instruments were contained in a small case that could be easily carried on the little finger of one hand; he employed the special instrument for its particular purpose. He knew "every trick of the tool's true play," and although I am informed by those who have a mechanical turn of mind that the Moynihan ⅝-circle needle is ill-designed, involving three separate movements in the insertion of each suture, nevertheless it was a beautiful tool in his hands and is still employed by many of his disciples. Some of his skill in the free-hand use of the needle he had learned from his former chief, Mayo Robson, whose house-surgeon, junior colleague and collaborator he was in the formative years of his surgical career.

He was the first surgeon in this country to use rubber gloves in his operations; Mikulicz had employed cotton gloves in Germany, and Halsted who introduced rubber gloves in the Johns Hopkins Hospital presented Moynihan with six pairs. His sterilised white cap, coat and trousers and his clean white shoes earned for him in his early days the sobriquet of the "pyloric pierrot." He employed blood-transfusion before the last war in patients who had lost blood or as a pre-operative measure in the anæmic. He brought home with him from America the Elsberg direct-transfusion cannula and was the first to employ blood-transfusion in this country. The original apparatus which he and Braithwaite used is preserved among his collection of instruments in the museum of the medical school at Leeds. He had the same respect for a drop of blood as Halsted, and exercised the most punctilious care over hæmostasis. Someone in his theatre was once heard to remark: "Is English blood then so precious?"

He was fortunate in his complete self-confidence and was even ready to operate upon those related to him, for he thought himself the most capable of all to surmount any unforeseen complication which might present itself during the performance of the operation. This supreme assurance never deserted him in the operating theatre. Nevertheless, as Leonard Braithwaite has written, he was never completely satisfied with any operation he performed, always thinking he might have done something better, ever striving after an ideal which no man could attain. He possessed sublime surgical courage, and this he exhibited in every branch of surgery which he

1. Extracts from the first Moynihan Memorial lecture given at the University of Leeds in the presence of the Princess Royal on Oct. 2, on the 75th anniversary of the birth of Lord Moynihan. The lecture will be published in full later.

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essayed. He was the first British surgeon to excise an aneurysm of the subclavian artery successfully, to perform a total gastrectomy successfully and to operate upon a chronic duodenal ulcer (1900), the first to remove a pancreatic calculus successfully, and the first to deal surgically with anastomotic ulceration following gastrojejunostomy. He shared with Sampson Handley the credit of the first operations for arterial embolectomy. According to Braithwaite "he often said that an operation was a religious rite. . . . In the operating theatre he was very stern and silent—no sound must be heard during the administration of the anæsthetic, and during the operation all must speak if at all in whispers—the gravest incident did not make him raise his voice or hurry his activity."

At times, however, he would assume a histrionic mien and, at the commencement of an operation for prostatic removal, would close his eyes and reverently murmur "In memory of Arthur Fergusson McGill, nephew and godson of Sir William Fergusson." He may have wished to acquaint visitors with the historic information that McGill was the first to remove a prostate transvesically and it certainly gave him an opportunity of adding that he had acted as assistant to McGill on the occasion of that pioneer operation in March, 1887.

Moynihan's published orations and addresses give him a right to a place among the most gifted medical writers of all time. His books were finished products of literary art. He excelled as a letter writer not only by reason of the charming things he would put in a letter, but in the delightful phraseology and his precise, beautiful handwriting. He had also every attribute to make his spoken word effective; his handsome face, charming voice, seeming self-assurance and obvious pleasure in his rôle all contributed to his success on the platform. His talents as a speaker were doubtless not unconnected with his Irish ancestry, but he took as much pains in the preparation of a speech as he did in helping a patient through the ordeal of an operation. To each task he gave his utmost. Apart from prepared discourse he was alert and apt in debate, powerful in committee and quick at repartee.

* * *

The success of the *British Journal of Surgery* and its pre-eminent position in surgical periodical literature are inseparably linked with the names of Hey Groves and Moynihan. Of Moynihan, as chairman of the editorial committee, Hey Groves has written "he brought to the work not only his consummate skill and tact, but his peculiar and at that time unique knowledge of the surgeons and surgical work of his country." He sagaciously suggested, for instance, that a representative on the editorial committee should be secured from every teaching school in Great Britain and Ireland, and also from amongst surgeons in India and the Dominions. Hey Groves is happily still at the helm after 27 years' service and Moynihan presided over the monthly editorial meetings until the time of his death.

He realised the value of surgical comradeship and of surgical travel and was able to inculcate his beliefs and aspirations into others. In July, 1909, he sent out a circular letter to a number of prominent provincial surgeons to discuss forming a surgical club. The club was born on the 23rd of that month, but was not christened until October, 1911, when it assumed the title of the "Chirurgical Club." When it had almost come of age, its name was changed to the "Moynihan Club."

The idea of an association of surgeons of Great Britain and Ireland had long captured Moynihan's imagination, and his dream was realised in 1920, when its first meeting was held in London under the presidency of Sir John Bland-Sutton. The object of the association was not only the discussion of scientific papers but the encouragement of friendships between British surgeons. This was one of his most valuable gifts to British surgery; thenceforth surgeons became "a band of brothers" and were no longer a crowd of jostling competitors. The men elected were those possessed of the highest surgical ideals. Membership is large, yet limited, and competition is still keen to be elected to its ranks. No more honourable body exists in the world today than the British Association of Surgeons.

This large body, however, did not provide the intimacies associated with smaller groups bound together by common surgical interest, close ties of friendship, or the bond of service to their country in war. Various travelling surgical societies of limited membership have sprung into being since the last war; not only has the Moynihan Club been the prototype of these foundlings, but Moynihan himself was invariably consulted about their inception and to his clinic each invariably made its first pilgrimage.

Moynihan was proud of his country and his country's mission in the world's politics. His international surgical reputation, his exceptional oratorical and literary talents and his personality all combined to make him a popular envoy wherever he travelled. From an early period in his surgical career he had cultivated the friendship of American surgeons and was in the habit of crossing the Atlantic at least once a year. The friendships which he made in the United States and Canada were cemented by return visits of surgeons to Moynihan's clinic who were attracted by his surgery and overwhelmed by his generous hospitality. His American addresses on England's war effort in the last great conflagration did much to convince our brethren across the Atlantic of the honourable ideals for which we were fighting and to persuade them to join the crusade for freedom. In his enthusiasm for American surgery he stimulated British surgeons, especially the younger ones, to make pilgrimages to the chief transatlantic clinics. Fresh friendships were forged between the countries and links between American and British surgery have been welded the stronger.

He was actively interested in the founding of the American College of Surgeons and was largely responsible for the dignified gesture of friendship made in the presentation of a mace for the newly formed College. It was the gift of the British consultant surgeons of the last war to their erstwhile comrades-in-arms, and Moynihan presented it at Montreal in 1920. He delivered his famous Murphy oration on the same day.

Teutonic surgical practice impressed Moynihan little. Visits to the German Reich evoked this remark: "The German always manages to do a simple thing in a difficult or cumbersome way." His visit to Latin-America had something of a political significance. European countries recognised the international character of the work of this arresting surgical personality and he was honoured in France and Belgium, in Serbia, Poland and Lombardy, and across the Mediterranean in Egypt.

* * *

Any estimate of Moynihan would arouse well-merited criticism if it were to present him solely in the dubious light of a panegyric. In the last few years faults and flaws appeared in this great surgical figure whom all had admired and many adored. During this eventide of his life he still occupied the surgical Woolsack as President of the Royal College of Surgeons of England and took his seat in the House of Lords as the first Baron Moynihan of Leeds, but these were no longer the years of wondrous surgical endeavour and achievement, and his operating theatre was no longer the Mecca for surgeons from all over the world. Degenerative changes stealthily taking place in his cerebral vessels, to which his death was ultimately due, caricatured and exaggerated the streak of vanity which had always been part of his make-up. Herein lies the real explanation of his latter-day faults and foibles; although his superb surgical craftsmanship never deserted him, unexpected attitudes of mind, unreasonable demands and faulty judgment occasionally revealed to his professional friends that processes of ingravescent decay had laid their hand upon this great surgical master.

In surgery and medicine the external badges of so-called leadership are not seldom merely the reward of service, and may betoken few of those attributes which have been noted by philosophers and historians as characterising the leaders of mankind. There have been great master surgeons, but few who merit the title of leader; Moynihan belonged to this select group. His beautiful craftsmanship made worshippers of all who saw him in his operating theatre; his words could convince, persuade, even mesmerise; he inspired his assistants and juniors with his own ideals and stimulated them to work for the advancement of surgery. On his death England offered him a place in the Valhalla of our country's heroes and leaders. This was an honour

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which, if we leave aside the transference of John Hunter's bones from St. Martin's-in-the-Fields to the Abbey, had only been offered to Lord Lister before him: Hunter—Lister—Moynihan. But he was buried in the environs of Leeds, where he had laboured for half a century. In his own words, "memorials are of many kinds: some are graven in stone, some are cast in bronze, some are written in letters of gold upon the roll of honour which enshrines the names of the saviours of their country. There is yet another memorial; it is borne in the hearts of those from whom a heavy load of suffering has been lifted, and from whom the cold hand of death has been turned aside." There is even another; it abides in the work and the ideals of those to whom was granted the happy privilege of association with the Master Surgeon, and of those who are permitted to carry on the torch which he fired and which blazed so brightly in his hands.

THE REALITY OF PARTIAL DEFICIENCIES*

By Leslie J. Harris, Sc.D. Camb., D.Sc. Vict.
(*From the Nutritional Laboratory, Medical Research Council and University of Cambridge*)

The argument that "because beri-beri is unknown in England therefore everyone must be having enough vitamin B_1" is false. There is a wide gap between the *minimum* diet (the amount needed to prevent well-defined clinical symptoms of deficiency) and the *optimum* (the amount needed to promote fullest health). Thus subnormal nutrition may be present even when there are no obvious physico-clinical signs.

EXAMPLES OF PARTIAL DEFICIENCIES

One of the best examples is the subclinical nutritional anæmia, so common among working-class infants and mothers. It is generally detected only by chemical test but is associated none the less with increased morbidity although not necessarily with any obvious clinical manifestation (H. Mackay). Again, it has been proved repeatedly that children show a better performance—weight, height, physique, skin, hair, nails, naughtiness, &c.—when extra supplements are included in their diet although their previous diets and clinical appearances were considered to be up to the "average," and therefore mis-named "normal." (References include: Corry Mann; the "Oslo experiment" in Scandinavia; milk in schools; and most recently the striking results of the Oslo breakfasts under the L.C.C.). Numerous tests both on animals and on humans illustrate the beneficial effect of increasing the intakes from the bare minimum to the optimum. For example, vitamin A has improved the dark-adaptation in various carefully controlled tests on apparently normal schoolboys; vitamin B_1 has improved the growth-rates and gastrointestinal function in young children. Likewise in the rat: half a unit of vitamin B_1 may be enough to keep the animal alive and prevent symptoms of beri-beri but not to allow a normal gain in weight, one unit will permit only bare maintenance without active growth, two units moderate growth, four units still better performance and so on, up to (according to Waterman and Ammerman, see figure) even thirty units or beyond. The dose-response curve gradually flattens out; but it is hard to know when sufficient vitamin B_1 has been given so that a further doubling of the dose does not still produce some detectable slight improvement.

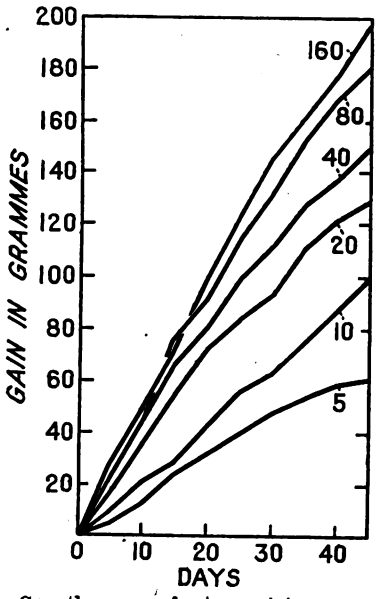
Vitamin C is no exception to the general rule, differentiating minima from optima. To deal first with the experimental animal, 0·5–1 mg. of ascorbic acid daily will prevent a guineapig getting recognisable "clinical" signs of scurvy. But if we pursue our inquiries a little further and make a microscopic examination of tooth structure we find that a considerably larger dose is needed for normal functioning of the formative cells. Administration of the bare scurvy-preventing dose will not prevent almost total degeneration of odontoblasts after two weeks. Likewise much more than the "minimal" dose is needed to confer maximal protection against infection. Szent-Györgyi has rightly ridiculed the idea of subdividing all mankind into two categories, (*a*) "Scurvy" and (*b*) "No scurvy," and supposing that the latter is synonymous with enough vitamin C for optimal health. In the human, as Göthlin and others since have shown, the consumption of the "minimal" dose of vitamin C needed to prevent actual scurvy is far short of the amount needed to prevent lowered capillary fragility. The increased susceptibility to infection on diets low in vitamin C is equally well authenticated, and a majority if not all workers correlate this with a lowered complement titre. Explorers have defined "irritability and uncalled for argumentativeness" as among the prescorbutic symptoms; pædiatricians have long been aware of sallowness and other prodromal signs in infancy.

Similarly, suboptimal intakes of vitamin D produce subclinical rickets—lowered assimilation of calcium and phosphate, minor bony defects, increased incidence of dental caries, and probably impaired muscular tone.

INCIDENCE OF UNDERNUTRITION†

Investigators have collected information about the occurrence of undernutrition in this country along several different channels, as follows. A few typical examples are cited under each heading.

Presence of disorders of nutrition.—Three examples are: (1) the occurrence of nutritional anæmia in 70% of bottle-fed infants, and in 40% of breast-fed infants in a poor part of London, or in 50% of poor-class women in Aberdeen; (2) the continued occurrence of rickets†; and (3) the high proportion of school-children in poorer districts found partially deficient in vitamins A and C by dark-adaptation and saturation tests.



Growth curves of rats receiving varying allowances of vitamin B_1 (after Waterman and Ammerman, *J. Nutrit.* 1935, **10**, 42). The rats were first depleted on a vitamin-B_1-free diet; then the supplements of the vitamin were given intermittently every fifth day. The figures on the curves show the intakes calculated on a daily basis, in microgrammes (3 microgrammes = 1 I.U.).

Results of experimental feeding.—Many examples could be cited and perhaps the best known is that of Corry Mann who showed that, in a residential school, children given extra milk had an average yearly gain of 6·98 lb. in weight and 2·63 in. in height, whereas children in the same school who did not have extra milk gained only 3·85 lb. in weight and 1·84 in. in height. Numerous recent experiences with supplementary milk amply confirm these findings.

Comparisons of different social groups.—Returns from the school medical officers for the varying grades of malnutrition are many times higher in certain poor districts than in well-to-do districts. Again, malnutrition is an important factor in infant mortality, the rate of which is twice as high in poor districts as in wealthy areas. In Newcastle-on-Tyne, according to some returns, the measles mortality-rate was three times as high in the poor districts, and the morbidity-rate eight times as high for bronchitis and pneumonia. It is certain that differences in nutrition is *one* of the principal factors responsible.

In addition to the foregoing, it has been possible to make estimates of a more indirect kind of the probable incidence of undernutrition in given areas, once certain justifiable assumptions have been made about the cheapest cost of an adequate diet or about the smallest

* Abstract of a paper prepared for the Dundee and Reading meetings of the British Association 1939, 1940 (cf. also *Brit. med. J.* 1939, 1, suppl. 305).

† For a more comprehensive treatise on the incidence and assessment of malnutrition see *Medical Officer* 1937, **58**, 225, 237, 249, 261 and 273. In the present abbreviated version some of the phrasing follows that of a recent article in *The Practitioner*, 1940, **145**, 105.

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amounts of various types of foodstuffs considered necessary for health.

Deficient dietary intakes.—The average consumption of milk in this country is only a small fraction of the optimum of one to two pints daily, or of that which is consumed in other countries where standards of physique and health are higher.

Deficient financial resources.—It is generally agreed that upward of 25% of the population are unable to afford the cost of an optimal diet (in 1936 Orr gave the figure as 50%). Before the war the minimum cost of an "optimum diet" was approximately 10*s.* per adult or 5*s.* per child per week, and it is common knowledge that large portions of the population are unable to attain this figure. "It is not until we reach the group with a family income of about £1 per head per week —i.e., £4 for man and wife and two children—that the diet, according to modern standards, is adequate for health" (Orr 1936).

Unfortunately, as is now being generally recognised, the assessment of the state of nutrition by the routine school medical service is liable to yield incomplete or misleading results. A cursory inspection of a child is not sufficient to reveal the existence of minor or partial degrees of dietary deficiency, and there is neither the time nor the specialised equipment to carry out the more modern tests for assessing the levels of nutrition, with respect to specific nutrients, such as the saturation tests for vitamins C and B_1, or the dysadaptation test for vitamin A mentioned above. The child can be weighed and its height measured, but records of the steady improvement in average weights and heights of schoolchildren in the past few years show how fallacious has been the practice of taking the average for a given area as the normal or the ideal.

"The evidence that inadequacy of diet is widespread is conclusive . . . the greatest single cause of malnutrition is poverty" (L.o.N. Committee on Nutrition).

ESTIMATION OF BLOOD-VOLUME IN PLASMA TRANSFUSION

BY

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"It is now generally accepted that the most important single requirement for arresting the progressive deterioration in general condition, which is such a feature of shock, is restoration of blood-volume and thereby of tissue metabolism." This sentence is italicised in the M.R.C. memorandum on the treatment of wound shock.[1] Restoration of blood-volume can be gauged by clinical improvement and especially by improvement in blood-pressure and pulse-rate during the course of transfusion, but any simple method which would enable some estimate of blood loss to be made would be an additional valuable guide as to the sufficiency of the transfusion. Provided blood-volume can be estimated, blood loss can be deduced by assuming a normal adult blood-volume of 5–6 litres according to physique. Under present conditions of warfare, with air-raid casualties many of which reach hospital within a short time of wounding, quite accurate estimates of blood loss can be made, because the patients are seen before compensating absorption of tissue fluids into the circulation has advanced sufficiently to have much effect on the figure to which the blood-volume had been reduced by the hæmorrhage.

Most methods for estimating blood-volume demand a complex technique, a troublesome collection of many large specimens of blood, and are therefore hardly suitable for application to exsanguinated and shocked patients whose collapsed vascular system is difficult to fill evenly with the essential dye solution and whose circulation is not improved by waiting the necessary 10, 15 or 20 minutes while the test samples of 15–30 c.cm. of blood are being extracted from collapsed veins.

On the other hand, a number of simple observations that can be carried out during the course of a plasma-transfusion afford a great opportunity for estimating blood-volume in selected cases of hæmorrhagic shock.

When a known volume of plasma is added to an unknown volume of blood the total volume of red cells in circulation is unaffected (assuming that hæmorrhage has ceased); the red cells can therefore act as an indicator of the amount of dilution brought about by the transfusion. Provided that the observations on the unaffected red cells are carried out immediately before and immediately after the rapid transfusion of a known volume of plasma a simple calculation will determine the original blood-volume of the transfused subject.

Suppose that a patient with an unknown blood-volume V has a hæmatocrit and cell-content of x% before transfusion, and after transfusion of P c.cm. of plasma his hæmatocrit reading is y%; what is the relation of V (unknown) to P, x and y, all of which are known? The answer is given by simple inverse proportion. $V : V + P :: y : x$ in which V is the only unknown quantity. But to those who desire a more detailed approach:

V = the original total blood-volume, and $\frac{Vx}{100}$ = the total cell-volume in terms of this blood-volume.

$V + P$ = the new total blood-volume, and $\frac{(V + P)y}{100}$ = the total cell-volume in terms of this new blood-volume.

But because the total cell-volume is unaltered by the addition of plasma

$$\frac{Vx}{100} = \frac{(V + P)y}{100} \qquad Vx = Vy + Py$$

$$V = \frac{Py}{x-y} = \frac{\text{volume transfused} \times \text{new hæmatocrit reading}}{\text{difference between hæmatocrit readings before and after transfusion}}$$

Example.—The hæmatocrit packed cell readings before and after transfusion of 1000 c.cm. of plasma are 44 mm. and 34 mm. respectively. Applying the above formula the original blood-volume is

$$\frac{1000 \times 34}{10} = 3400 \text{ c.cm.}$$

This calculation makes use of hæmatocrit values, but any other red-cell properties (all of which are unaltered in total by plasma-transfusion) may be used in the same manner—e.g., a hæmoglobin estimation or red-cell count obtained by a mere finger prick. These simple bedside methods give excellent scope for the approximate calculation of blood loss, and so for research into what is believed to be the fundamental pathology of shock.

The main fallacy of all methods for the estimation of blood-volume in exsanguinated subjects is that hæmorrhage is continuing while the test substance is being injected. Ideally hæmorrhage should always have ceased. Taking the example given above, a person with a blood-volume of 3400 c.cm. who is transfused with 1000 c.cm. of plasma, and who during the transfusion loses as much as 500 c.cm. of blood, would, with an original hæmatocrit reading of 44, be found at the end to have a calculated blood-volume of 3000 c.cm. Even this error does not place the method outside the bounds of practical utility.

The method has the advantage also that the circulation is progressively improved by the injection of relatively large volumes of protein fluid and this reduces the errors due to uneven dispersion and circulatory stagnation. Indeed, observations made after the transfusion of two or three pints of plasma tend on this account to be more accurate than those made after the transfusion of a single pint. Furthermore, plasma itself, in a case of simple hæmorrhage, does not rapidly leave the circulation, and, perhaps most important, the patient is not awaiting treatment during the period of observation.

The precautions that need to be observed are the same as with dye methods—the plasma must be transfused quickly during the period of observation. A pint in ten

1. M.R.C. War Memorandum, No. 1, 1940. H.M. Stationery Office.

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minutes gives an opportunity for a primary observation while other amounts following equally quickly provide ample and even more reliable data for confirmatory deductions. The principle of this method, making use of plasma, was previously used in certain animal experiments by Scholander.[2]

SUMMARY

When a known volume of plasma is rapidly transfused the patient's blood-volume can simply be calculated from the hæmatocrit readings, hæmoglobin estimations or red-cell counts immediately before and after the transfusion.

A GALACTOSE-TOLERANCE TEST IN EXPERIMENTAL LIVER NECROSIS

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VARIOUS modifications of the galactose-tolerance test are used clinically. The usual practice is to administer the galactose by mouth and to estimate the total quantity excreted in the urine during a standard time; in other tests the amount of galactose in the blood is estimated. These oral galactose tests are complicated by the variability of the rate of absorption of the sugar from the intestine (see the succeeding paper by King and Aitken). We here record experiments with rabbits in which the liver was damaged experimentally and the subsequent impairment of liver function was tested by the rate of disappearance of galactose from the blood after injection of a standard amount. Carbon tetrachloride was used as a liver poison because this compound has been shown by Cameron (1936, 1937) to produce a suitable degree of liver damage. The method we have adopted is similar to that used by Poulson (1933) in studying hepatic dysfunction in rabbits whose livers had been rendered necrotic by poisoning with shale oil. Poulson estimated the total blood-sugar (glucose plus galactose). In the present experiments a differential method of sugar analysis is used which makes it possible to estimate the actual galactose present. A few experiments are included in which galactose was given by mouth, to show the variable level to which the blood galactose may rise with this method of administration.

TABLE I—ADMINISTRATION OF CARBON TETRACHLORIDE

Rabbit	Dosage	Doses (at 3-day intervals)	Total dosage (c.cm./kg.)	Survival	Rabbit	Dosage	Doses (at 3-day intervals)	Total dosage (c.cm./kg.)	Survival
28	0·4	1	0·4	4 days	53	0·1	2	0·2	1 week
29	0·4	1	0·4	2 ,,	69	0·1	2	0·2	5 days
30	0·4	1	0·4	few hours	70	0·1	2	0·2	6 ,,
33	0·1	8	0·8	survived	54	0·2	2	0·4	6 ,,
34	0·1	2	0·2	1 week	59	0·2	4	0·8	2 weeks
35	0·1	2	0·2	1 ,,	66	0·2	5	1·0	survived (killed)
52	0·1	4	0·4	2 weeks					

EXPERIMENTAL METHOD

Liver damage with carbon tetrachloride.—The carbon tetrachloride was dissolved in mineral oil to give a 20% solution; 5 c.cm. of this solution injected intraperitoneally in rabbits weighing 2·5 kg. (= 0·4 c.cm. of carbon tetrachloride per kg. body-weight) was fatal in a few hours or days. The same or even larger amounts administered in small spaced doses (0·1 c.cm. or 0·2 c.cm. of carbon tetrachloride per kg. of body-weight) produced a less acute degree of liver damage which the animals were able to survive for one to two weeks. Two animals were resistant to the liver poison and were later killed (table I). Liver necrosis developed in all these animals. The detailed histological reports are shown in the table.

Rabbit 28.—Necrosis followed by complete disappearance of liver cells from the central quarter of each lobule, where only a network of Kupffer cells remains, enclosing spaces partly empty and partly filled with erythrocytes. Damaged area is sharply defined and abuts on apparently healthy liver cells.

Rabbit 29.—Uniform necrosis of liver cells, affecting all but the outermost few cells of each lobule. A few relatively healthy cells immediately round the portal tracts, and next to these a few living cells showing severe fatty change. Remaining liver cells of each lobule necrotic; Kupffer cells have survived to a greater extent than liver cells, though many appear swollen.

Rabbit 30.—Section intensely engorged with blood; sinusoids distended. Liver cells show uniform fatty change in the form of fine droplets; many pyknotic; some, particularly towards centre of lobules, undergoing necrosis.

Rabbit 34.—Whole liver necrotic except for portal tracts. Surviving tissue only found in bile-ducts, arteries, veins, and connective tissue in portal tracts. Kupffer cells necrotic.

Rabbit 35.—A few surviving liver cells round the portal tracts; scattered odd cells show severe fatty change but are still apparently surviving. Remaining liver cells completely necrotic, though most appear to have undergone fatty change first. Kupffer cells have survived better than liver cells.

Rabbit 52.—Change appears to be midzonal necrosis. Cells appear relatively healthy at periphery of lobule. About midway to centre of lobule a zone of necrosis from which many liver cells have disappeared; a few necrotic remnants of liver cells made out; in the centre of lobule liver cells present but shrunken and sometimes fatty.

Rabbit 53.—Complete necrosis of all liver tissue, with only portal tracts surviving (exactly similar to rabbit 34).

TABLE II—BLOOD GALACTOSE OF NORMAL RABBITS AFTER ADMINISTRATION BY STOMACH-TUBE OF 1 G. GALACTOSE PER BODY-WEIGHT

Rabbit	Blood galactose (mg. per 100 c.cm.)				
	½ hr.	1 hr.	1½ hr.	2 hrs.	3 hrs.
308	2	6	5	5	4
309	4	7	13	18	—
311	18	34	40	35	—
312	19	9	10	6	6
313	—	56	43	43	8
314	—	9	22	29	23

Rabbit 54.—Midzone necrosis similar to rabbit 52. Zone of necrosis is wider and involves rather more than a third of each lobule.

Rabbit 59.—Necrosis of central cells of each lobule, similar to that seen in rabbit 28; necrosis less strictly localised but of about equal severity.

Rabbit 66.—Some disappearance of liver cells from centre of lobules, though very little necrosis or degeneration seen. Amount of liver tissue destroyed does not appear great. Early but definite cirrhosis.

Rabbit 69.—A few relatively healthy cells at periphery of lobules; remainder show fatty change and in many cases pyknosis or complete disappearance of nucleus. A few cells at centre of lobules have completely disappeared; Kupffer cells appear unaffected.

Rabbit 70.—Widespread necrosis of midzone so severe as to leave only a few surviving cells at either end of lobule.

LIVER-FUNCTION TESTS

Phosphatase was determined in a few cases by the King and Armstrong (1934) phenyl phosphate method.

Galactose-tolerance tests.—The excretion of galactose in the urine and the estimation of galactose in the blood (table II) after oral administration gave too variable results to make these methods satisfactory tests of hepatic function. A test in which the galactose was injected parenterally and the blood galactose followed was investigated. The details are given below.

Method of estimation of galactose.—The reducing capacity of a Somogyi (1931) copper tungstate deproteinised

2. Scholander, P. F. *Skand. Arch. Physiol.* 1938, **78**, 189.

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filtrate of unlaked blood gives a measure of the true sugar content (King, Haslewood, and Delory 1937); it is equal to the difference between the reducing values before and after fermentation of the sugar in the blood with washed yeast. Bakers' yeast does not destroy galactose in solution when they are incubated together, whereas glucose is completely removed in a few minutes. It is therefore possible to estimate galactose in the presence of glucose by first removing the glucose with bakers' yeast and then determining the remaining sugar (galactose) by one of the reduction methods. This principle furnishes a simple method of determining galactose in the blood after the sugar has been administered.

Galactose solution for injection.—To keep the volume of injected fluid small, galactose has been used in concentrated solution—50% w./v.; 50 g. of galactose is placed in a 100 c.cm. volumetric flask (or 500 g. in a 1-litre flask), and water is added nearly to the mark. The mixture is placed on a hot-water bath and is shaken till solution is complete, water being added as the solid dissolves. The solution is allowed to cool to room temperature, the volume is adjusted to 100 c.cm., and the solution is well mixed. It is then passed through a Buchner filter, placed in small bottles with rubber caps in 10 c.cm. and 60 c.cm. quantities, and "steamed." The bottles are stored at room temperature: crystallisation may take place if the solution is chilled.

Administration of galactose.—Intraperitoneal injection of 10 c.cm. of a 50% solution of galactose into normal rabbits led to rising curves of blood galactose which reached their peaks (150–180 mg.) only after two hours and were still high (about 100 mg.) at three hours. The response to a smaller amount (1 g.—i.e., 2 c.cm. of solution—per kg.) showed a tendency to reach the maximal blood-galactose value at one hour and to return to about the resting level at the end of three hours. But although elevated curves were obtained with animals poisoned with carbon tetrachloride (see fig. 1) and this form of the test appeared suitable for animal experiments, the intraperitoneal injection of galactose was not pursued further, because it is not an ideal mode of administration for man.

TABLE III—BLOOD GALACTOSE OF NORMAL RABBITS AFTER INTRAVENOUS ADMINISTRATION OF 1 G. GALACTOSE PER KG. BODY-WEIGHT

Rabbit	Date	Blood galactose (mg. per 100 c.cm.) 5 min.	1 hr.	2 hrs.	3 hrs.	Rabbit	Date	Blood galactose (mg. per 100 c.cm.) 5 min.	1 hr.	2 hrs.	3 hrs.
308	March 24	162	47	28	5	311	March 24	183	47	11	0
	April 23	205	66	30	8		April 23	208	41	14	2
	May 2	225	55	28	2		May 3	252	62	22	6
	,, 9	251	49	15	0		,, 10	—	52	23	2
	June 8	247	56	15	1		,, 22	226	55	10	0
	,, 15	—	68	12	1						
	,, 22	—	62	20	2	312	April 12	207	58	23	1
	July 27	—	68	42	4		,, 24	237	68	17	2
							May 3	220	52	34	7
309	March 24	157	50	5	0		,, 9	—	40	21	4
	April 23	163	41	18	6		,, 10	—	54	30	0
	May 2	214	62	28	4						
	,, 9	224	35	23	0	313	April 12	217	69	19	0
	June 8	206	39	32	3		,, 24	264	64	20	2
	,, 18	—	60	18	0		May 3	154	44	21	2
	,, 22	—	85	50	12		,, 9	197	50	29	2
							,, 16	180	40	13	0
310	March 24	186	50	35	21						
	April 23	201	61	32	2	314	April 12	192	70	27	0
	May 2	270	66	27	3		,, 24	181	60	23	0
	,, 9	203	61	16	2		May 9	196	42	18	1
	June 15	—	60	15	1		June 8	210	63	26	1
	,, 23	—	77	32	3		,, 15	—	38	6	0
	,, 27	—	60	46	17		,, 22	—	58	21	20
							,, 27	—	83	42	3

Intravenous administration gave easily reproducible curves; 1 g. of galactose per kg. of body-weight was injected into the marginal vein of the rabbit's ear. The first sample of blood was taken five minutes later from the other ear, and succeeding samples at one, two, and three hours. In all normal animals in which this procedure was tried the galactose had disappeared, or nearly disappeared, from the blood by the end of three hours. The five-minute samples usually showed levels of 200–250 mg. per 100 c.cm.; the galactose fell rapidly during the first hour to about 60 mg. and more gradually during the second and third hours (see table III). In later work a sample was taken at one and a half hours instead of those at one and two hours.

Galactose-tolerance tests were carried out on normal rabbits and on rabbits poisoned with carbon tetrachloride. Galactose was injected intraperitoneally in rabbits 28, 29, and 30. The results are shown in fig. 1. The composite normal curve is the average of several tests. The disturbance of hepatic function consequent on the liver poisoning is seen both in the shape of the galactose curves and in the raised values of serum phosphatase.

Intravenous galactose-tolerance tests were conducted on 10 normal rabbits which subsequently received a series of injections of carbon tetrachloride. In fig. 2 is given a set of curves to illustrate the response. A composite curve shows the average response obtained in the untreated animals. Tests performed after the administration of carbon tetrachloride had begun are shown in the other curves. Usually the disappearance of galactose from the blood is considerably slower; the level being higher at one and a half hours and at the end of the three-hour test period. The damaged livers of these animals are supposedly unable to metabolise the administered galactose and to remove it from the blood as fast as do normal livers. The individual responses for the several rabbits, together with their weights before treatment and at death, are given in table IV.

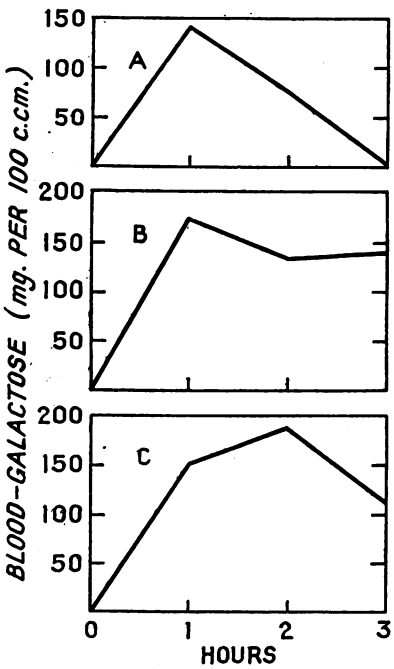

FIG. 1—Galactose-tolerance tests before and after liver damage due to carbon tetrachloride: A, composite curve for 3 normal rabbits (serum phosphatase 8, 10, and 10 units); B, rabbit 28 one day after administration of carbon tetrachloride (serum phosphate 17 units, 35 units on second day); C, rabbit 29 one day after administration of carbon tetrachloride (serum phosphatase 16 units, 27 units on second day).

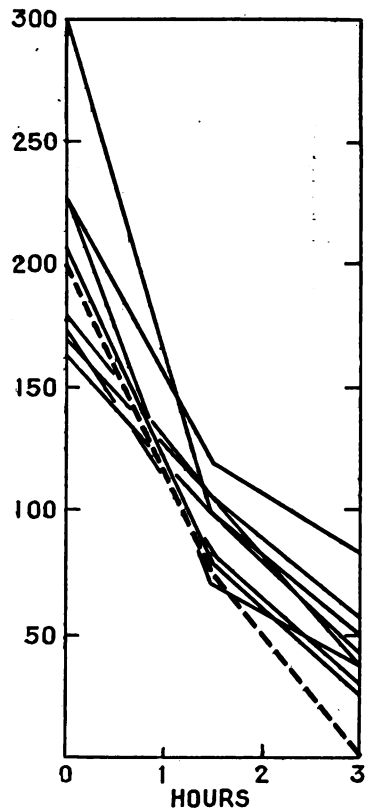

FIG. 2—Intravenous galactose-tolerance tests: interrupted line, average response of 10 normal rabbits; continuous lines, responses of individual animals after liver poisoning due to carbon tetrachloride.

SUMMARY

Liver necrosis has been produced in rabbits by the administration of carbon

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TABLE IV—INTRAVENOUS GALACTOSE-TOLERANCE TESTS

Rabbit	Before carbontetrachloride and after treatment started	Blood galactose (mg. per 100 c.cm.) 5 min.	1½ hr.	3 hrs.	Weight (g.) Before treatment	At death
33	Before	112	79	22	2420	2060
	4 days after	225	118	82		
34	Before	163	51	0	2520	2200
	3 days after	163	98	40		
35	Before	214	106	3	2450	2500
	3 days after	206	78	26		
52	Before	201	81	0	2680	2420
	3 days after	170	104	56		
	10 days after	203	70	29		
53	Before	181	72	19	2650	2470
	4 days after	180	106	38		
54	Before	210	52	10	2570	2450
	5 days after	174	81	29		
59	Before	252	64	10	2420	1600
	4 days after	165	94	48		
	13 days after	210	58	48		
66	Before	154	66	8	2920	1580
	13 days after	226	72	38		
	23 days after	304	98	49		
69	Before (Not done after)	217	72	2	3350	3180
70	Before (Not done after)	243	83	10	2070	1835

tetrachloride, and several modifications of the galactose-tolerance test of hepatic function have been studied. A procedure is described in which the galactose is administered intravenously and the rate at which galactose disappears from the blood is determined. This has been found to be a convenient and reliable means of testing liver dysfunction.

We are indebted to Prof. G. R. Cameron for advice on the dosage of carbon tetrachloride.

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AN INTRAVENOUS GALACTOSE-TOLERANCE TEST

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THE galactose-tolerance test, introduced by Bauer in 1906, is widely used clinically in attempting to differentiate between toxic and obstructive jaundice. As most commonly employed, the test consists in the oral administration of 40 g. of galactose, followed by analysis of the urine passed in the succeeding five hours to determine the total amount of galactose excreted. If the liver (and to a lesser extent, other tissues) has metabolised the administered galactose to such an extent that less than 3 g. is excreted in the five hours following ingestion, its functional capacity is held to be unimpaired. The excretion of more than 3 g. of galactose is considered to indicate subnormal hepatic function. This procedure is admittedly only a rough test of liver function, but it is simple and easily performed and has been held by Shay et al. (1931, 1937) to give results which fit the clinical and post-mortem findings in most cases. Piersol and Rothman (1928) considered it to have little value.

The rise in the total blood-sugar following oral administration of galactose has been studied by several workers, including Kahler and Machold (1922), Harding and van Nostrand (1929), Beaumont and Dodds (1931), and von Uexküll (1939). Two objections to this method of conducting the test have been raised: the rise in blood-sugar is not entirely due to galactose, some extra glucose being present in the blood after the administration of galactose; and the rate of absorption of galactose from the intestine may be sufficiently variable to make difficult the interpretation of the blood-sugar curves.

The first objection may be overcome by determining the blood galactose rather than the total blood-sugar. Fortunately there is a simple means of accomplishing this differentiation; it is possible quantitatively to remove glucose from blood by the fermentative action of yeast without destroying any of the galactose. Raymond and Blanco used this principle in 1928; Grant and Glaister described a satisfactory procedure for estimating galactose in the blood in 1933. Although blood-galactose determinations have been made, after oral administration, as a test of liver function in several laboratories, few publications on the subject have appeared. Harding and Grant (1933) showed the variable level to which galactose might rise in the blood-stream after ingestion of a standard amount. Althausen, Lockhart, and Soley (1940) used this form of galactose-tolerance test in the study of thyroid disease; and MacLagan (1940) described its satisfactory application to cases of jaundice and of hyperthyroidism.

The rate of absorption of galactose is greater than that of any other sugar in the rat (Cori 1925). This widely quoted finding has led to the belief that galactose is an ideal substance for use in tolerance tests. But its rate of absorption in man is certainly variable and, in our experience, after 40 g. has been taken by mouth the blood galactose may be anything from a few milligrammes to 60 mg. per 100 c.cm. This great variation in the peak of the blood-galactose curve suggested that a more satisfactory procedure would be to give the sugar intravenously to ensure flooding of the system with galactose in all subjects at the beginning of the test. The rate at which galactose disappeared from the blood should then furnish some measure of the glycogenic function of the liver, which is the principal tissue concerned with its conversion into glycogen.

Intravenous galactose-tolerance tests have been employed on the continent for some years (Pollak 1932, Budak 1933). In these tests a relatively small dose of galactose (8–10 g. in a 40% solution) was administered and the total blood-sugar estimated at short intervals for ½ to 1 hour. Experiments have been made on animals with artificially produced liver damage (see preceding paper, King, Harrison, and Delory, this issue); in these, attempts were made to test the hepatic function by plotting blood-galactose curves, after the intravenous injection of large amounts of the sugar. This work led to a study of liver-function tests at the Hammersmith Hospital, and an intravenous galactose test has been developed for application to man. The technique finally adopted is very like that of Jankelson and Lerner (1934; Jankelson, Segal and Aisner 1936), and similar results have been obtained.

EXPERIMENTAL PROCEDURE

A solution of galactose (50 g. per 100 c.cm. of solution) is prepared and sterilised by filtration and steaming (see preceding paper).

Graded doses of galactose.—The patient receives no breakfast. An amount of solution equivalent to 0·5 g. of galactose per kg. of body-weight—e.g., 60 c.cm. of the 50% solution for a 60 kg. person—is injected intravenously from a 100 c.cm. syringe, the injection being given slowly over about five minutes.

Standard dose of galactose.—The injection of 50 c.cm. of a 50% solution of galactose has given with adults results indistinguishable from those obtained with

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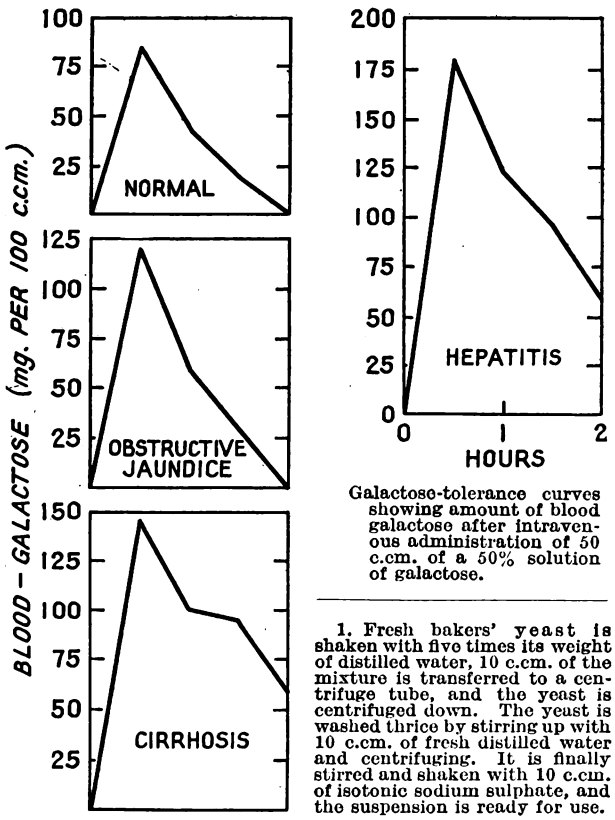
graded doses. This is a much more convenient amount to inject, because most hospital wards have 50 c.cm. syringes, whereas 100 c.cm. syringes are usually special equipment. Tables I and II give results for the graded and standard doses in normal and non-hepatic cases. Tests carried out by both procedures in cases of jaundice gave results so similar that the graded dose was eventually abandoned in favour of the standard injection of 50 c.cm.

Samples of blood.—The first sample of blood is taken immediately after the administration of the galactose (5 minute sample), the second sample at ½ hour, and further samples at 1, 1½, and 2 hours. In later work a sample taken before the galactose administration has been substituted for that at 5 minutes. This resting sample is a useful check on the analytic method because it should contain no galactose.

Analysis.—The samples of blood (0·2 c.cm. of capillary blood) are washed into centrifuge tubes containing 2·2 c.cm. of isotonic sodium sulphate; 1 c.cm. of yeast suspension is added.[1] The contents of the tube are thoroughly mixed and are kept at 37° C. for 15 minutes. This treatment completely removes the glucose. Then 0·3 c.cm. each of a 10% solution of sodium tungstate and of a 7% solution of copper sulphate is added, and the mixture is gently shaken. The precipitated proteins and yeast are centrifuged or filtered, and 2 c.cm. of the filtrate (equivalent to 0·1 c.cm. of blood) is used for the estimation of the sugar. If the Harding copper method described by King, Haslewood, and Delory (1937) is employed, the factor 162 is used for conversion of the titration figure (cubic centimetres of 0·005 N thiosulphate) into milligrammes of galactose per 100 c.cm. of blood. The procedure is fully described in a forthcoming paper (King, Haslewood, Delory and Beall 1940).

RESULTS

The galactose values are plotted against time and for a normal person usually give a curve which begins about 200 mg. of galactose per 100 c.cm. of blood, falls steeply during the first hour, and reaches a figure between 0 and 10 mg. per 100 c.cm. at the end of two hours. In most cases of obstructive jaundice the curve of blood galactose follows the same course, there being little or no galactose left in the blood at the end of two hours.



Galactose-tolerance curves showing amount of blood galactose after intravenous administration of 50 c.cm. of a 50% solution of galactose.

1. Fresh bakers' yeast is shaken with five times its weight of distilled water, 10 c.cm. of the mixture is transferred to a centrifuge tube, and the yeast is centrifuged down. The yeast is washed thrice by stirring up with 10 c.cm. of fresh distilled water and centrifuging. It is finally stirred and shaken with 10 c.cm. of isotonic sodium sulphate, and the suspension is ready for use.

TABLE I—BLOOD AND URINE GALACTOSE AFTER INTRAVENOUS INJECTION OF 0·5 G. OF GALACTOSE PER KG. OF BODY-WEIGHT

Blood galactose (mg. per 100 c.cm.) 5 min.	½ hr.	1 hr.	1½ hr.	2 hr.	Urine galactose, total excreted in 4 hrs. (g.)	Diagnosis
160	149	76	26	0	—	Normal
115	28	0	0	0	3·2	Healed gastric ulcer
104	66	37	0	0	3·5	Healed gastric ulcer
147	40	5	0	0	3·1	Convalescent from pneumonia
194	76	63	60	5	—	Pneumonia
146	76	11	0	0	2·8	Cerebellar degeneration
—	63	26	15	5	4·7	Pulmonary tuberculosis, arthritis
95	—	17	0	0	2·9	Disseminated sclerosis
91	—	13	9	0	4·7	Pleurisy
94	—	29	20	0	5·1	Muscle strain
199	—	53	13	0	2·6	Duodenal ulcer
207	—	62	—	0	—	Duodenal ulcer

TABLE II—BLOOD GALACTOSE AFTER INTRAVENOUS INJECTION OF 50 C.CM. OF A 50% SOLUTION OF GALACTOSE

—	48	—	16	0		Normal persons
300	53	12	10	0		Normal persons
—	65	10	8	0		Normal persons
130	69	30	8	0		Normal persons
143	65	43	24	0		Normal persons
130	88	75	20	0		Normal persons
140	100	40	0	0		Normal persons
—	60	30	18	0		Normal persons
—	68	40	30	0		Normal persons
160	—	32	16	0		Normal persons
100	78	60	—	3		Normal persons
190	92	86	30	0	—	Duodenal ulcer
148	47	35	19	6	4·6	Diabetes
187	98	28	3	0	2·5	Duodenal ulcer
132	57	16	16	0	4·8	Cystitis
228	162	97	0	0	6·0	Duodenal ulcer
200	113	31	31	0	—	Duodenal ulcer
307	52	8	8	0	3·7	Normal
200	112	87	28	0	3·5	Coronary thrombosis
138	79	32	0	0	3·3	Duodenal ulcer
138	73	50	33	8	3·8	Gastritis
200	114	75	32	0	—	Myxœdema
226	120	89	32	0	4·9	Hæmochromatosis

In conditions of liver damage the level of galactose in the blood does not return to the normal level within the two hours. Representative curves are shown in the accompanying figure. From them the 5 minute results have been omitted. The detailed results are given in the tables. The level of blood galactose is extremely variable in the first (5 minute) specimen. This is inevitable because of the variable time which it takes to inject the galactose in different people. The ½, 1, and 1½ hour specimens show greatly different values for different people, but on the whole the curve of blood galactose appears to be lower in the normal, non-hepatic, and obstructive jaundice cases than it is in the toxic and infective groups. The 2 hour figure seems most important. In all normal and non-hepatic cases the blood galactose had dropped to less than 10 mg. at the end of 2 hours. In 8 of the 10 obstructive cases it had returned to 10 mg. or less. Of the 15 cases of toxic and other non-obstructive jaundice, 12 gave definitely abnormal results (one of them three times), and in the other 3 the slight clinical jaundice was of doubtful origin.

The urinary galactose (total excreted in the 4 hours following injection) was estimated in most of the cases. The results, given in the tables, do not bear any relation either to the blood galactose figures or to the clinical findings.

SUMMARY AND CONCLUSION

A galactose-tolerance test of hepatic dysfunction is described in which 50 c.cm. of a 50% solution of galactose is injected intravenously and the blood galactose is determined at intervals thereafter.

This modification of the galactose-tolerance test is free from theoretical objections, and the results given show that in nearly all cases it distinguishes clearly between jaundice due to liver-cell damage and jaundice due to gross obstruction of the biliary tract without liver-cell damage. That is its practical value; it is not suggested that it will detect minor grades of liver damage in patients who are not jaundiced.

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TABLE III—INTRAVENOUS GALACTOSE-TOLERANCE TESTS IN JAUNDICE

Case	Blood galactose (mg. per 100 c.cm.) 5 min.	½ hr.	1 hr.	1½ hr.	2 hr.	Urine galactose, total excreted in 4 hrs. (g.)	Diagnosis
			OBSTRUCTIVE JAUNDICE				
1	246	120	57	—	4	5·8	Carcinoma of head of pancreas
2	162	113	35	24	3	4·4	Obstructive jaundice
3	205	127	97	87	60	9·1	Malignant disease of colon
4	241	—	18	—	0	—	Three weeks' jaundice following parturition, thought to be obstructive
5	251	—	48	24	8	5·0	Carcinoma of stomach; obstruction of common bile-duct
6	128	—	68	—	10	1·8	,,
7	255	231	81	37	24	5·2	Carcinoma of "head" of pancreas
7a	202	125	65	16	16	—	,, ,,
8	136	—	16	—	0	—	Carcinoma of stomach"
9	152	—	12	—	6	—	Obstruction of common bile-duct
10	212	130	57	8	0	—	Carcinoma of head of pancreas
			JAUNDICE OF TOXIC AND OTHER ORIGIN				
11	194	150	98	98	57	—	Cirrhosis of liver
12	251	200	195	82	32	—	,, ,,
13	191	—	94	76	71	3·9	,, ,,
13a	183	—	112	87	79	4·3	,, ,,
13b	199	—	111	—	82	—	,, ,,
14	171	—	35	—	25	—	,, ,,
15	167	—	65	—	21	3·1	Splenic anæmia, enlarged liver.
16	178	—	65	16	15	—	Banti's disease, enlarged liver
17	348	194	121	97	56	—	Subacute recurrent hepatitis
18	267	137	115	81	29	5·5	Catarrhal jaundice
19	185	76	62	47	5	—	Catarrhal jaundice (2 wks.)
20	121	90	45	16	0	4·1	Catarrhal jaundice ?
21	160	143	—	16	16	—	Catarrhal jaundice
22	187	94	87	85	22	—	Alcoholism, gastric ulcer, jaundice
23	305	130	—	48	8	2·2	Hepatomegaly
24	327	—	74	65	28	2·4	Congestive failure, enlarged liver, 3 weeks' jaundice
25	278	187	71	—	39	1·2	Parkinsonism, enlarged liver, jaundice

7a, three weeks later; 13a, a week later; 13b, two months later.

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EFFECT OF CALCIUM ON DIURESIS IN CARDIAC DECOMPENSATION

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In many patients with cardiac failure one of the objects of treatment is to get rid of œdema fluid. Singer (1921) found that the intravenous administration of calcium salts caused a temporary diuresis in cardiac and renal disease. Cheinisse (1922) claimed that calcium aided the diuretic action of digitalis in patients with œdema of cardiac failure. Blum (1922) thought that calcium chloride exerted a powerful diuretic effect, but he attributed this to the chloride ion. Loewenberg (1923) found that, although small amounts of calcium, sufficient to increase the efficiency of ventricular contraction, did not exert a diuretic action, large doses did. Segall and White (1925) stated, as a result of their observations on seventeen patients, that calcium chloride could be used as a diuretic in patients who did not respond satisfactorily to the usual treatment. In contrast with all these workers Brull (1924) maintained that calcium had no diuretic effect but might even reduce the output of urine by vasoconstriction of the peripheral arterioles, including those of the kidney.

Most of the work previously undertaken on the diuretic action of calcium has been done with the chloride, which probably owes its efficiency to its acid-producing effect. In the present investigation it was desired to investigate the effect of calcium uninfluenced by any tendency to acidosis. Accordingly calcium gluconate was used; in later cases parathyroid extract was employed to raise the concentration of calcium in the serum.

CALCIUM GLUCONATE

Ten patients with cardiac œdema were studied. Calcium gluconate in doses of 10 c.cm. of a 10% solution was given intravenously every day for several days. The daily urinary output was measured, and the fluid intake was kept constant throughout the period of investigation. In one patient who had no previous drug treatment the calcium gluconate caused a slight increase in urinary output. Of the eight who had

INCREASE IN DIURETIC EFFECT OF DIGITALIS WHEN PRECEDED BY INJECTIONS OF CALCIUM GLUCONATE

Case	Treatment	Days of treatment	Daily average output of urine (c.cm.)
1	Digitalis	26	1250
	Calcium	6	1570
	Digitalis	8	1830
2	Digitalis	12	1450
	Calcium	3	1510
	Digitalis	10	1860
3	Digitalis	24	490
	Calcium	3	610
	Digitalis	18	870
4	Digitalis and mersalyl	52	1600
	Calcium	4	1480
	Digitalis	29	2160
5	Digitalis and mersalyl	42	1420
	Calcium	3	1280
	Digitalis	35	2150
6	Digitalis and mersalyl	50	790
	Calcium	6	700
	Digitalis	22	700
7	Digitalis	21	580
	Calcium	15	670
	Digitalis	30	750

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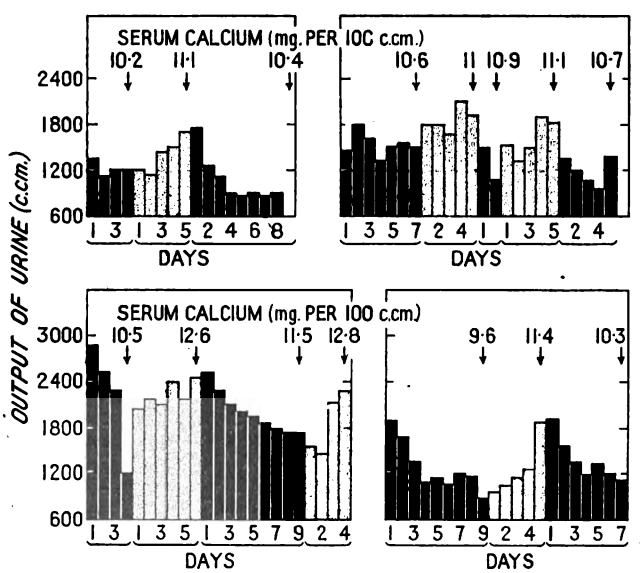
previously been receiving digitalis, the substitution of calcium gluconate produced in three a slight increase, and in three a slight decrease in the excretion of urine; in the other two, when calcium was given in addition to digitalis, there was a slight increase in diuresis. In one patient substitution of digitalis for calcium led to a definite rise in urinary output. It is obvious therefore that the administration of calcium has little if any effect on the output of urine. The results (see table) show, however, that in six out of seven cases, the injection of calcium gluconate enhanced the diuretic effect of digitalis. The increased diuresis obtained during the digitalis therapy following the administration of calcium gluconate suggests that calcium sensitises the diuretic action of digitalis, probably by improving its cardiotonic effect.

PARATHYROID EXTRACT

It has long been known that calcium plays a part in the regulation of water metabolism. Thus, during the perfusion of frogs with a fluid deficient in calcium œdema is rapidly produced. Clinicians, too, have remarked on the association of hypocalcæmia and œdema. The work of Salvesen (1934) and of Graham and Oakley (1938) and unpublished results of N. Morris and J. H. Hutchison indicate that calcium may exert a beneficial influence on impaired renal function.

The intravenous administration of calcium salts leads to a transitory rise in serum calcium. It seemed possible that the excretion of urine might be more affected by maintaining the serum calcium at a higher level continuously over longer periods. For this purpose Parathormone 20 units daily was injected either intramuscularly or intravenously. The effect of this procedure was studied in ten patients with cardiac œdema. In only one was there lack of response, in the remaining nine definite reduction of œdema was noted after treatment with parathormone was begun. In four of these nine it was possible to measure the daily output of urine. The figures show the increased diuretic response to parathyroid extract and a fall in urinary output when it was stopped and as the effect subsided. In two cases where a second course of parathyroid therapy was given a further rise in urinary volume took place. The charts (see figure) show that the increased output of urine is associated with a rise in the level of the serum calcium. The patient in whom parathormone did not produce diuresis showed no change in the level of serum calcium, which remained at 10·0–10·2 mg. per 100 c.cm.

These results indicate that the use of parathyroid extract enhances the effect of Mersalyl. The œdema was greatly reduced during treatment with parathormone; but, so far as could be ascertained, neither pulse-rate nor blood-pressure was significantly affected. It appears, therefore, that the parathyroid hormone, acting directly or through the increase in serum calcium, produced an effect either by the transference of fluid from water-logged tissues to blood-stream or by an action on the renal mechanism.



Charts showing increased output of urine associated with a rise in the level of the serum calcium. Black columns indicate administration of salyrgan; stippled columns, salyrgan and parathormone.

SUMMARY

Calcium gluconate was administered intravenously to ten patients with cardiac œdema. It had little immediate effect on the urinary output. In six out of seven patients who had previously been receiving digitalis the diuretic effect of this drug was increased when given after a course of injections of calcium gluconate. In nine out of ten patients with cardiac œdema injections of parathyroid hormone enhanced the diuretic action of mersalyl and digitalis.

We wish to thank the Medical Research Council for an expenses grant and Dr. W. Martin, medical superintendent of Stobhill Hospital, for his help.

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SPLINTS FOR FINGERS AND THUMB

By W. I. de Courcy Wheeler, Kt., M.D. Dubl., F.R.C.S.I.
SURGEON REAR-ADMIRAL, R.N.

In his recent book on fractures[1] Watson-Jones lays down four admirable rules for the treatment of injuries of the fingers and thumb: (1) the injured finger must be immobilised; (2) the injured finger must be immobilised in flexion; (3) no finger except the injured one must be immobilised; and (4) every uninjured finger must be actively exercised. The three splints illustrated here are designed to fulfil these requirements.

The *first splint* (fig. 1) has been christened the Baby Thomas. It provides extension and fixation for the thumb or first finger of either hand. If the size is reduced it is also applicable to the little finger. The shape and size of the ring were planned after experimenting with Stent, the pliable material used by dentists. The ring decided on is oval, with a longer diameter of 2 in. and a shorter of 1½ in. The angle at which the ring is set and the shape of the opening are important in preventing too much pressure between the fingers and at the knuckle. The side bars are 4½ in. and 6½ in. long. Silver bronze wire of 14 gauge is used for the side bars and a slightly thicker wire for the ring. The latter is padded with ⅛ in. saddler's felt covered with chamois leather. The side bars can be bent at any point to produce flexion, and a strip of strapping from bar to bar will act as a support behind. The splint is put on in the same way as a Thomas splint for the lower limb. A strip of adhesive strapping almost the length of the finger is applied to the skin along each lateral margin. Each strip has a loop at the end to carry the extension tapes or strings. The finger is surrounded with a single broad strip of Elastoplast, which prevents the extension strips slipping and gives comfort and protection to the skin. When the extension tapes are tied the splint and finger are enclosed by a simple bandage.

In the last war extension of the fingers by traction was found to be one of the only successful remedies for stiffness of the joints and contractures after injury. Slight extension, such as this splint provides, is sufficient for all purposes if it is maintained without interruption.

The *second splint* (fig. 2) is designed for immobilisation without traction. Most of the splints in common use immobilise the metacarpophalangeal joint and interfere with the free movements of the hand. They are often difficult to secure in position. This splint consists of two

1. Watson-Jones, R. Fractures and Other Bone and Joint Injuries, Edinburgh, 1940.

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gutters made of thin sheet copper (20 or 21 gauge), which is easily obtained. The gutters are about an inch long and an inch wide. They are connected by a wire (14 gauge) which leaves a gap of slightly less than an inch between them. The wire must be firmly attached to the gutters so as to allow bending of the wire for flexion at either or both interphalangeal joints. The splint may be applied in three ways, two of which are illustrated in fig. 2 (B) (C). In the third the gutters are applied laterally and the wire runs obliquely across either the palmar or dorsal aspects of the finger. The position used will depend on the site of the injury. The splint is fixed to the finger by strips of adhesive which encircle the gutters, and the fixation may be reinforced by bandage, elastoplast or plaster-of-paris.

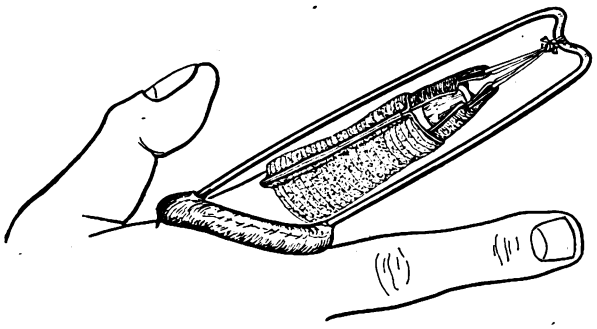

FIG. 1—Miniature Thomas splint. The extension strips of adhesive are surrounded by a single broad strip of elastoplast.

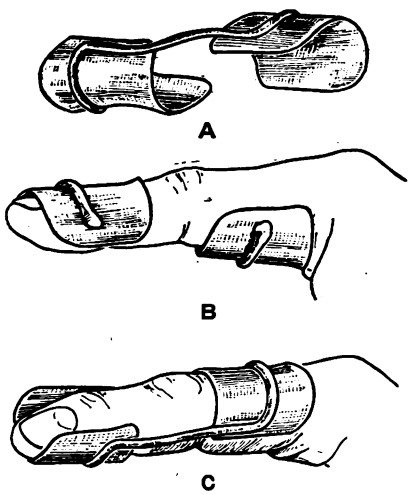

FIG. 2—(A) Splint for immobilising fingers without traction. (B) Applied in first position. The adhesive surrounding the gutters and finger is not shown. By bending the wire flexion can be secured at the interphalangeal joints. (C) Splint applied in second position.

The *third splint* (fig. 3), which has been described elsewhere,[2] is designed for Bennet's fracture of the thumb. It is a padded aluminium gutter splint with a large aperture at the distal end. A wire gallows is attached to this opening in the position of an abducted thumb. If the extension tapes are kept taut and the splint is firmly secured to the forearm with plaster-of-paris for about three weeks the result is satisfactory. Fixation for an additional three weeks in light plaster is usually desirable. A simple method of making a loop at the end of a strip of adhesive is shown in fig. 4.

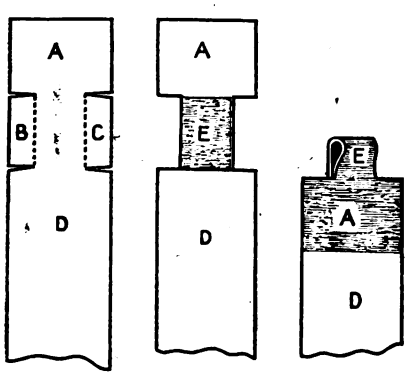

FIG. 4—Simple method of making loops on strips of adhesive strapping. The two flaps B and C are folded inwards into position E. A is then folded down on D. The shaded areas are non-adhesive.

* * *

Mobile fingers with a tendency to flexion contracture can be kept extended by strips of elastoplast applied as in fig. 5. It is well to put a little powder on the skin covering the proximal interphalangeal joint so that the adhesive will not stick at this point. The strip is applied proximal to the knuckle and is then stretched and carried down the dorsal aspect of the finger to the nail. A second strip is superimposed in the same way for reinforcement. To prevent these strips slipping the finger is surrounded by one broad piece of elastoplast. The dorsal strips act like an additional extensor tendon.

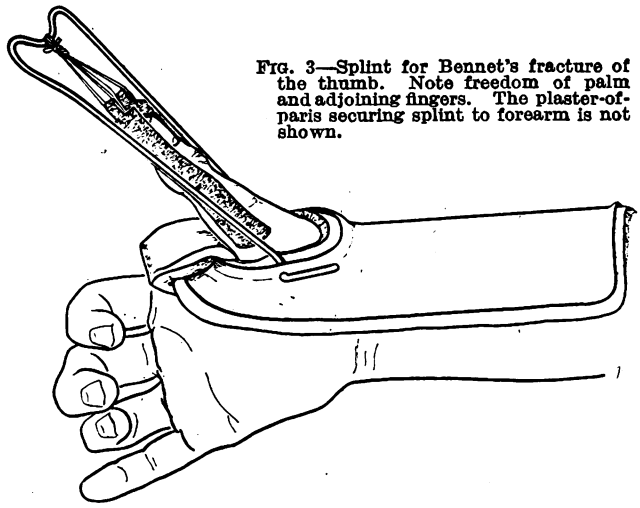

FIG. 3—Splint for Bennet's fracture of the thumb. Note freedom of palm and adjoining fingers. The plaster-of-paris securing splint to forearm is not shown.

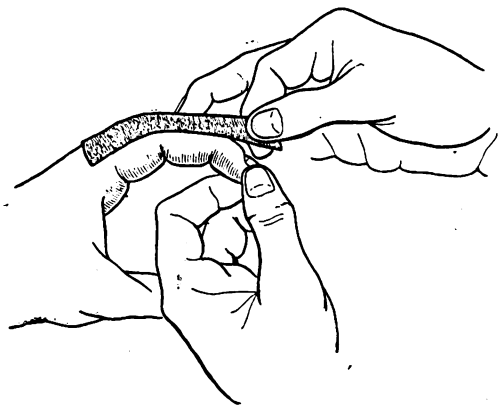

FIG. 5—Elastoplast strip applied to maintain extension. A second strip is superimposed and the whole is surrounded by one broad strip.

2. *J. Bone Jt Surg.* 1937, 19, 520.

THE discovery of the ophthalmoscope was furthered by an ophthalmologist who remembered that his father had dismissed a servant because his eyes shone unpleasantly at night. Night-shining eyes, though common enough in animals, are rarely seen in man. The explanation was recently recalled in a letter from Sir John Parsons to *Nature* (Sept. 14, p. 366). The rays reflected from the fundus of the emmetropic eye emerge as a parallel beam and cannot enter an observer's eye unless it is directly in the beam—a fact made use of in ophthalmoscopy. In highly hypermetropic eyes the beams emerging diverge widely and the observer can catch the reflection from a considerable area. In the same way rays from a highly myopic eye may enter the eye of an observer after they have crossed. In either case the incident light must be very bright. Most mammals have hypermetropic eyes and some of them are equipped with a special reflecting membrane, the tapetum, which is absent in man. Glioma of the retina in the infant pushes the retina so far forward as to render the eye highly hypermetropic; the condition is usually discovered because the mother notices a yellow reflex from the pupil giving the so-called "amaurotic cat's eye" appearance. This mundane explanation of the business takes some of the shine out of luminous eyes. Who would give tuppence for a Dracula who was merely hypermetropic?

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POLYRADICULONEURITIS (GUILLAIN-BARRÉ'S SYNDROME) IN EAST ANGLIA

By H. Stuart Barber, M.A., M.D. Dubl., M.R.C.P.I.
ACTING SQUADRON-LEADER, R.A.F.O.

In the winter of 1916 Guillain, Barré and Strohl described two cases of polyneuritis which they distinguished from other types of polyradicular neuritis and claimed as a clinical entity. Since then the condition has come to be recognised on the Continent as the Guillain-Barré syndrome. The characteristics stressed by Guillain are a diffuse polyneuritis, an acellular albuminosis in the cerebrospinal fluid and an almost invariable and full recovery. The febrile polyneuritis which Holmes described in 1917 differs only in the presence of fever and the absence of hyperalbuminosis. In a personal communication C. P. Symonds suggests that both types almost certainly belong to the same group, but that Guillain has over-emphasised the acellular hyperalbuminosis and Holmes the presence of fever. During the past winter a series of cases of polyneuritis occurred in East Anglia which in many respects resembled the Guillain-Barré syndrome.

SYMPTOMS AND SIGNS

The onset is sudden, often when the patient is in good health, although occasionally a sore throat may be present when the paralysis appears. An association with sore throat has been suggested as an ætiological factor even when more than a month has elapsed between the pharyngitis and the onset of paralysis, but this assumption seems to be unjustifiable since the disease is prevalent at a time of year when sore throats are common. Cases have been reported in adults of seventy and in children, but the disease mostly affects adults between twenty and thirty. The sexes seem to be equally affected, although Boudouresque (1938) maintains that the disease is commoner in females.

In most of the present series the first symptoms were paræsthesiæ affecting the hands and feet, a tingling or numbness and sometimes slight pains. In one patient sudden weakness in both legs was the earliest manifestation. Rarely one of the cranial nerves, especially the seventh, is first affected. When the paræsthesiæ were the earliest symptom, weakness of the limbs followed rapidly, often within 24 hours, and the resultant weakness rather than malaise compelled the patient to take to his bed. Fever in the two cases in which it was present was slight and transient. The motor symptoms were to some extent progressive, but when the legs and forearms were affected they were involved at the same time. Weakness of the muscles of the trunk is sometimes found. The distal parts of the limbs were commonly the most severely affected. In some cases there was a general weakness of all the muscles without complete paralysis, so that the coarser movements although ataxic were still possible. A striking feature was the symmetry of the paralysis. Transitory changes in the respiratory and cardiac rhythms have been recorded. In these cases the paralysis was flaccid and hypotomia was the rule, but hypertomia has been observed. The tendon reflexes were lost, and, although it is recorded that the superficial reflexes may disappear, in some of the cases reported here they were unusually brisk. Idiomuscular contractions on light percussion also became more active. There was no true muscular atrophy of the limbs involved and the electrical reactions while weak never showed the reaction of degeneration.

Paræsthesiæ of the extremities persisted for an appreciable time after the onset. Guillain (1933) says that violent spontaneous pain is sometimes present and in this series the muscles were usually tender on pressure. Objective sensory changes were slight, consisting of some diminution of pain, touch and temperature sensibility. Changes in deep muscle sensation and stereognosis have been observed. Involvement of the sphincters is uncommon but transitory. In one case there was incontinence of urine on two occasions.

The cerebrospinal fluid in some cases was characteristic but in others showed no abnormality. It was clear and not under increased pressure. The outstanding feature of the abnormal fluids was the increase in protein. Xanthochromia has been observed but is rare. The remaining constituents are normal, although the colloidal benzoin test occasionally gives a meningitic curve.

Progress was slow but almost always favourable, the patients recovering completely after weeks or months. Some deaths have been recorded by Boudin (1936) but Guillain maintains that these should not be included in the group originally described by him. The tendon reflexes may remain absent for as long as five years after recovery. Fatigue and pain in the muscles were present for some weeks after the return of power, but these disappeared with adequate rest.

Treatment consists of massage and exercises. Preparations of vitamin B have been used but results are difficult to assess in a disease that tends to recover spontaneously.

DIFFERENTIAL DIAGNOSIS

Polyradiculoneuritis must be differentiated from the following conditions.

Anterior poliomyelitis is characterised by a paralysis generally maximal at the time of the onset. The paralysis is typically atrophic and the paralysed muscles give the reaction of degeneration. In the cerebrospinal fluid there is no dissociation between albumin and cells.

Because of the association, immediate or remote, with sore throats, *post-diphtheritic polyneuritis* must sometimes be considered, especially as the cerebrospinal fluid may show the same changes in that condition. The paralysis in diphtheria develops fairly typically—an initial cranial-nerve palsy followed by weakness of one or more limbs. In the early stages a throat swab will help in diagnosis.

Syphilis will be recognised by the history and other physical findings or a positive Wassermann reaction in the blood and cerebrospinal fluid.

ÆTIOLOGY

Among the civilians the question of contact was ruled out. There appears to be a definite seasonal incidence, for the majority of cases occur in the autumn and winter months.

The cause of the condition is probably a neurotropic virus, although Biémond (1938) says that it lacks the essentials of a virus infection—a primary destruction of the nerve parenchyma, a tendency to spread rapidly throughout the nervous system and reproduction of the disease by inoculation. Guillain has unsuccessfully tried to transmit the disease to monkeys. Guillain and Barré suggest that the virus is more irritative than destructive and envisage a congestive œdematous state of the nerves which recovers completely. An intoxication has been suggested, but neither this nor a dietary deficiency seems likely in the present series. A neurotropic virus remains the only rational explanation. As with poliomyelitis, perhaps slight attacks pass unrecognised and confer immunity, while in some of the population the immunity is not so complete or the attacks are more severe. It is of interest that about the time when these cases arose there were widespread epidemics of mild "influenza" and rubella, both presumed to be virus diseases. Polyneuritic sequelæ have been noted after several cases of rubella by Sprott (1940).

HISTOLOGY

Pathological changes have been observed by Boudin (1936) in patients presumed to have died from polyradiculoneuritis, and Holmes carried out some investigations on two of his patients who died from intercurrent respiratory infections. The nerves are the site of a diffuse interstitial neuritis which is at a maximum near the origin of the nerve and diminishes towards the periphery. There is an irregular lymphocytic infiltration and the cells of the sheath of Schwann show a nuclear proliferation. Weigert and Scharlach staining demonstrates an alteration in the myelin sheaths and a partial fatty degeneration. The axis cylinders pursue an irregular course and their affinity for silver stains appears to be diminished. The root ganglia show similar changes. The brain is normal, but the meninges are sometimes

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œdematous. The muscles show no changes. The continued absence of reflexes for a long period after the complete return of power remains a pathologically unexplained finding. It cannot be attributed to weakness of the musculature in patients who are able to walk and carry out their normal duties. It must therefore be due to a more serious involvement of the afferent links of the reflex arc than that sustained by the motor fibres.

TYPICAL CASES

CASE 1.—A patient, aged 22, admitted to a service hospital on Feb. 5, 1940. He had become ill on Feb. 1 with paræsthesiæ of the hands and feet followed by paralysis of all extremities. He had had a severe sore throat a month before.

Temperature normal. Paralysis of extensors of wrists, fingers, feet and toes. Loss of power in flexors of hands and legs. All tendon reflexes lost. Superficial reflexes present and brisk. Exceptionally brisk idiomuscular contractions easily elicited by light percussion. Cutaneous sensation, joint, deep muscle and vibration sense normal. Slight tenderness on pressure of muscles. Urinary incontinence on two occasions. Blood-count normal. Blood sedimentation-rate 3 mm. (Westergren). C.S.F. clear, not under pressure (protein 200 mg. per 100 c.cm., cells 4 per c.mm., W.R. negative).

On Feb. 20 he began to feed himself, and by March 11 he was getting up daily. On March 13 the C.S.F. showed protein 250 mg. per 100 c.cm., globulin +, cells 2 per c.mm., Lange 000000000. By July 10 power had fully returned. Some numbness at finger tips. Reflexes still absent.

CASE 2.—A patient aged 21, admitted to a service hospital on Feb. 22, 1940, complaining of pains in both legs, ankles and feet. He had had a sore throat in September, 1939, and had been admitted to a civil hospital with weakness of both legs in October, diagnosed as diphtheritic neuritis. After 14 days in hospital he had been unable to walk and later had developed weakness and paræsthesiæ in his hands so that he could not feed himself. He had been discharged to duty from the civil hospital on Jan. 8, 1940. Temperature normal. Power in lower limbs poor. Deep reflexes absent in all limbs; superficial reflexes normal. Cutaneous sensation normal. Some tenderness on compression of calf muscles. Blood-count normal. B.S.R. 4 mm. C.S.F. clear, not under pressure (protein 90 mg. per 100 c.cm., globulin +, cells 3 per c.mm., Lange 111100000).

By March 26 the deep reflexes had returned and the C.N.S. was normal.

CASE 3.—A patient, aged 20, admitted to a service hospital on Feb. 12, 1940. Diagnosis diabetes mellitus. He was balanced by Feb. 21 on 12 line diet and 35 units of insulin daily. Marmite was included in the diet. On the 30th he complained of weakness in both legs, which became more severe and compelled him to remain in bed next day.

Temperature normal. Paralysis of all muscle groups in both legs except quadriceps. Some loss of tone. Slight loss of power in upper limb. Except for sluggish triceps response tendon reflexes all absent; superficial reflexes normal. No paræsthesiæ or cutaneous sensory loss. Some tenderness of muscles on compression. No alteration in joint or deep muscle sense. Lumbar puncture not performed.

On May 17 he was up all day, and he was discharged on June 2, his reflexes still being absent.

The question of a diabetic polyneuritis arose in this case, but he was sugar free when the paresis set in and he made a spontaneous recovery without any alteration in his diet or insulin. Diabetic neuritis is unusual in young subjects and sensory symptoms are as a rule well marked. There was no evidence of a dietetic deficiency. He was seen by Prof. J. A. Ryle, who agreed that he could not be a case of diabetic neuritis.

CASE 4.—A soldier, aged 25, admitted to hospital on Dec. 26, 1939, complaining of severe pains and extreme weakness in all four limbs. He had had a sore throat on the day before admission, and gave a history of recurrent quinsies since the age of 13. He developed bilateral quinsy twice while in hospital.

Temperature normal. Complete loss of power in all four limbs. Muscles of limbs and erector spinæ hard and tender. Stiffness of arms and legs, at first taken for spasticity. Tendon reflexes thought to be diminished at first but became brisk in a few days. Superficial responses normal. Slight loss of cutaneous sensation over inner side of left arm. Extreme tenderness of all limbs. Sensations in other respects normal. Sphincters normal. Pupils widely dilated and unequal but reacted to light and accommodation. Slight weakness of right face. Blood-count normal. Lumbar puncture not performed.

Progress was very slow, and there was some wasting from the long period in bed. Pains ceased after 6 or 7 weeks. By April 8 he was able to sit up in bed but was still unable to feed himself. By July 1 he was able to walk.

ATYPICAL CASES

The remaining cases, although not fitting exactly into the syndrome of Guillain-Barré, arose during the same period and must be considered part of the epidemic.

CASE 5.—A patient, aged 21, admitted to a service hospital on Jan. 18, 1940, for suspected pneumonia. He had been in the station sick quarters for 11 days before admission. On the day before admission he had noticed weakness in both arms.

Temperature 103·2° F., pulse-rate 108, respirations 32. Weakness of deltoids in both arms. Tendon reflexes normal. No loss of sensation. Some numbness and tenderness on pressure of deltoids. Signs of bronchopneumonia at left base.

Jan. 20, right arm improved; some contraction in deltoid. Jan. 24, right deltoid muscle contracts normally; left shows no change; fullness at left base, small quantity of fluid aspirated. March 3, posterior fibres of left deltoid contract slightly. March 13, C.S.F. protein 48 mg. per 100 c.cm., cells 0·5 per c.cm., Lange 000000000. May 20, almost full power has returned to left deltoid.

CASE 6.—A schoolgirl, aged 15, admitted to Addenbrooke's Hospital on Dec. 12, 1939, complaining of backache for 14 days. On Dec. 9 the pains had become much worse and later she had developed diplopia and lost her voice.

Febrile. Both legs very weak. Tendon reflexes lost; superficial responses normal. Diplopia, loss of voice, difficulty in swallowing and nasal regurgitation. Retention of urine. No diphtheria bacilli obtained from throat or nasal swab on culture. Lumbar puncture not performed.

Dec. 16, developed lobar pneumonia; pupils fixed and dilated with poor reaction to light and accommodation; slight weakness of right face. The pneumonia was treated with sulphapyridine and gave no anxiety after first few days. Swallowing improved rapidly and voice returned. Jan. 19, 1940, still slight pyrexia; tingling and tenderness in toes; calf muscles slightly tender and tendo achillis on both sides extremely so. Discharged from hospital on Feb. 7, 1940, by then the tendon reflexes had returned and the palatal weakness had improved; both pupils remained large and sluggish in their reaction to light and accommodation; right facial weakness had disappeared.

CASE 7.—A platelayer, aged 35, admitted to Addenbrooke's Hospital on Feb. 28, 1940, complaining of paralysis of face. Three weeks before he had developed severe backache, soon followed by weakness of both legs. The legs gradually improved and when he was admitted full power had returned.

Temperature normal. Complete lower-motor-neurone paralysis of both facial nerves. Other cranial nerves normal. Motor power of limbs normal. Tendon and superficial reflexes and sensation normal. C.S.F., protein 20 mg. per 100 c.cm., cells normal, W.R. negative.

Discharged on March 21 with the facial weakness somewhat less.

In all the service cases the possible activation of a neurotropic virus by T.A.B. or A.T.T. was considered, but none of them have lately been inoculated or vaccinated.

Professor Ryle tells me that during the same period and in the same region he saw two more cases in consultation. The first was in a plump and healthy woman, who after a "cold and sore throat" developed extreme weakness in all limbs and pins and needles in the fingers and toes, but after ten days was well on the way to recovery. The second was in a young man who had an almost complete symmetrical paralysis of all four limbs without pain or sensory loss.

SUMMARY

Seven cases of acute polyneuritis seen in East Anglia between December, 1939, and February, 1940, were probably examples of Guillain-Barré's syndrome, though two were atypical. The ages ranged from 15 to 35 years. There had been no known contact between them.

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The condition is most often seen in the autumn and winter. The onset is sudden, with paræsthesiæ of the extremities, sometimes preceded by sore throat. The paræsthesiæ are quickly followed by a flaccid symmetrical paresis of the limbs and sometimes of the trunk and face, with absent tendon reflexes, and muscular tenderness. Occasionally there is transient fever in the early stages. The cerebrospinal fluid often shows an increase in protein with no change in the cell content. Progress is slow, but complete recovery is the rule.

The main pathological change is a diffuse interstitial neuritis maximum near the origin of the nerves. The cause is probably a neurotropic virus, though there is no definite evidence of infectivity.

Diagnosis has to be made from anterior poliomyelitis, diphtheritic neuritis and syphilis. There is no specific treatment.

My acknowledgements are due to the Medical Director-General of the service. I have to thank Professor Ryle for permission to publish cases 4 and 6 and to Dr. C. H. Whittle for permission to publish case 7. I should also like to acknowledge the help of Professor Ryle and Group Captain C. P. Symonds R.A.F.V.R. in the preparation of this paper.

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MORBIDITY AND DEATH-RATES IN THE GREAT TOWNS

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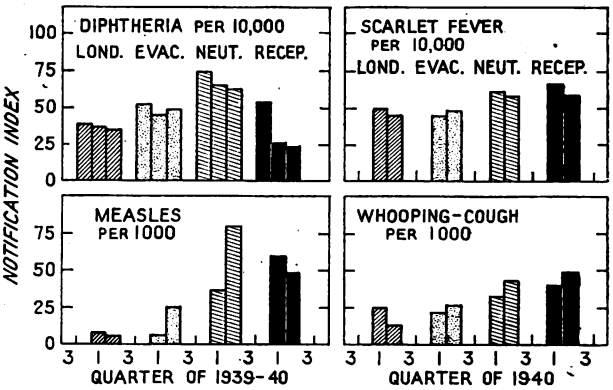
The Registrar-General's Weekly Return records the deaths from all causes and from seven infective diseases in each of the great towns—i.e., towns with a population of 50,000 or more—and the notifications of infective diseases in each separate administrative area; but in view of the large movements of population which have taken place, particularly affecting the age-groups most responsible for spreading many of these infections, it is difficult at present for anyone lacking the necessary information about these migrations to obtain a clear picture of the trends of death-rates or of morbidity in different parts of the country. At the beginning of September, 1939, some 735,000 school-children were removed under the Ministry of Health's arrangements from London and certain other ports and industrial towns designated as "evacuation" areas to more suitable "reception" areas, some of which were great towns.[1] During the ensuing months many children gradually drifted back to their homes; but it has been possible from the records at various dates to estimate approximately the mean populations of children resident in each area during each quarter of the year. There have been extensive movements also of other sections of the population which necessitate a quarterly revision of all local population estimates by means of the records of births, deaths, removals, and transfers to the non-civilian portion of the community.

This report compares the trends of quarterly death-rates up to the end of June, 1940, from all causes and from diphtheria, measles, whooping-cough, and cerebrospinal fever, corrected for all the measurable disturbing factors, in groups of the great towns classified as "evacuation," "neutral," and "reception" areas. Notification-rates (see figure) for scarlet fever, diphtheria, measles, whooping-cough, and cerebrospinal fever are also examined in the same way. It must be

1. Glover, J. A. *Proc. R. Soc. Med.* 1940, **32**, 399.



Quarterly notification indices at ages under 15 in London and in groups of other great towns in evacuation, neutral, and reception areas.

remembered in comparing these groups of towns that not only were children transferred in large numbers from the "evacuation" to the "reception" towns but also, perhaps more important in the case of some of the diseases, there was in the "evacuation" towns almost complete closure of schools during the December and March quarters followed by a large measure of reopening in the June quarter, whereas in the "neutral" towns there was partial closure and in the "reception" towns the schools remained open throughout. A social experiment on an unprecedented scale has thus been made, and some lessons may perhaps be learnt from the facts here presented.

DEATH-RATES FROM ALL CAUSES

To obtain quarterly death-rates in the great towns really comparable with the national rate and with each other, the registered deaths were corrected to those of persons giving a residential private address, permanent or temporary, in the town; the populations at risk were estimated by the usual method up to August, 1939, and thereafter by means of the National Register machinery; and the resulting rates were then adjusted for the effects

TABLE I—ADJUSTED QUARTERLY DEATH-RATES FROM ALL CAUSES PER 1000 LIVING IN GROUPS OF GREAT TOWNS

Urban group	Quarters							
	1938		1939				1940	
	3rd	4th	1st	2nd	3rd	4th	1st	2nd
England and Wales ..	9·9	11·5	15·2	11·7	9·9	11·9	20·3	11·5
Greater London	8·9 *(86)*	10·6 *(87)*	14·5 *(91)*	10·2 *(84)*	8·9 *(86)*	11·3 *(89)*	19·7 *(90)*	11·2 *(90)*
Group of—								
"Evacuated" towns ..	11·6 *(112)*	13·5 *(111)*	17·2 *(108)*	13·7 *(113)*	11·2 *(109)*	13·6 *(107)*	24·3 *(111)*	13·9 *(111)*
"Reception"	9·5 *(91)*	11·1 *(91)*	14·5 *(91)*	11·1 *(92)*	9·9 *(96)*	11·3 *(89)*	18·8 *(86)*	10·2 *(82)*
"Neutral"..	10·5 *(101)*	12·3 *(101)*	16·0 *(100)*	12·2 *(101)*	10·7 *(104)*	12·9 *(102)*	22·2 *(102)*	12·7 *(102)*
126 great towns	10·4	12·2	16·0	12·1	10·3	12·7	21·8	12·5

The italic numerals in parentheses denote the percentage of the rate in the great towns.

of differing age-constitutions of the populations by the use of the areal comparability factors, these being recalculated for periods since August, 1939, by means of the National Register and from information about the numbers of school-children billeted away from their homes at different dates. In the last three quarters the rates relate to civilians only. All the rates given in this paper are provisional figures subject to slight correction when the complete data are available.

Table I shows the adjusted quarterly death-rates, thus computed, in each quarter from mid-1938 to mid-1940 for England and Wales; Greater London; a group of great towns comprising the seventeen largest "evacuation" areas outside Greater London; a group comprising

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all the great towns to which were sent school-children exceeding in proportion a third of the original population of the town at ages 5–14; a group comprising five of the largest "neutral" towns which were not disturbed by any official movements of school-children; and the 126 great towns as a whole.

The death-rate in the first quarter of 1940 in the country as a whole was 20·3 per 1000 civilians living, a rate which was last exceeded (20·9) in the first quarter of 1929, when a severe winter coincided with a considerable influenza epidemic. Since 1929, however, the age constitution of the population has changed progressively in a manner favourable to a higher crude death-rate, and comparison of the standardised death-rates (based upon the usual standard population of 1901) shows that the figure calculated for the March quarter of 1940, about 14·5, was well below that in 1929 (17·8) although above that for any March quarter since. In the 126 great towns the adjusted death-rates in the December, March, and June quarters of 1939–40 (comparable with the national crude rates in the first line of table I) were 12·7, 21·8, and 12·5 respectively, compared with 12·2, 16·0, and 12·1 in the corresponding quarters of 1938–39.

Greater London's adjusted death-rate from mid-1938 to mid-1939 was about 87% of the general average for the great towns, and this index rose to 90 for the first half of 1940. The group of "evacuated" towns, all outside Greater London and industrial areas in the main, had an index of about 111% of the general urban average in the period from mid-1938 to mid-1939, falling to about 108 in the latter half of 1939 but returning to 111 in the first half of 1940. The index for the group of "neutral" towns rose slightly from about 101 to about 102. In the group of "reception" towns the pre-war index of 91 rose to 96 in the September quarter of 1939 but has fallen in each quarter since, reaching the low level of 82% in the June quarter of 1940. The general conclusion from table I seems to be that, although at first the "reception" towns suffered and the "evacuation" towns benefited, as regards the general death-rate, owing probably to the transfer of an undue proportion of infirm persons at the outbreak of war, the relative position of the "reception" towns has steadily improved since, while that of Greater London has become rather less favourable.

The separate towns included which suffered the highest death-rates during the March quarter of 1940 were Manchester-Salford (30·2), Liverpool-Bootle (27·2), and Nottingham (26·0). Manchester-Salford normally has a death-rate about 20% above that of the great towns' aggregate, but in the severe March quarter the excess was 39%. In Nottingham, which normally has a death-rate about 9% above average, the excess became 19%. The Tyneside group of towns, on the other hand, with a normal excess of 15–20%, returned a rate below average in the March quarter of 1940 (21·3). Blackpool's death-rate, which was 12% above the great towns' average in the period from mid-1938 to mid-1939, has been 12% below average in the three quarters since the outbreak of war, but Plymouth and Portsmouth have shown

TABLE II—QUARTERLY DIPHTHERIA DEATH-RATES PER 100,000 LIVING AT AGES UNDER 15 (CORRECTED FOR TRANSFERS)

Urban group	Quarters							
	1938		1939				1940	
	3rd	4th	1st	2nd	3rd	4th	1st	2nd
Greater London ..	19	22	18	12	12	13	16	10
Great towns outside greater London—								
"Evacuation" areas	28	34	37	29	29	31	37	24
"Reception" areas ..								
Group A ..	26	28	42	16	18	27	13	16
Group B ..	21	25	16	22	9	19	21	13
Total	23	26	26	20	13	23	17	14
"Neutral" areas	36	40	47	22	21	37	31	35
126 great towns (including those in Greater London)	26	31	32	22	21	28	27	22

relative changes of the opposite kind. In the June quarter the rates ranged from over 14 in Manchester-Salford, Stoke, the Tyneside towns, and Liverpool to below 10 in Oxford, Cambridge, and Eastbourne.

DIPHTHERIA

Table II shows the death-rates for diphtheria, obtained by reducing the quarterly deaths (fully corrected for transfers) by a sixteenth to allow for the few deaths at ages 15 and over, dividing by a fourth of the estimated mean population at ages under 15 during the quarter, and multiplying by 100,000. In this table, as in tables V–VIII, all the great towns outside greater London are grouped into towns scheduled as "evacuation" areas at the outbreak of war; towns classed as "reception" areas to which were sent in the first instance school-children exceeding a third of the resident population at ages 5–14 (group A); towns classed as "reception" areas which received in the first instance smaller proportions of school-children (group B); and towns classed as "neutral" areas.[2]

In 1937 and in 1938 the diphtheria death-rate per 100,000 at ages under 15 in England and Wales as a whole was 31. For the great towns the corresponding index for the six months from October, 1938, to March, 1939, was 31·4, and for the corresponding period of 1939–40 it was 27·6; so no considerable change in the death-rate from diphtheria took place in the towns as a whole,

TABLE III—QUARTERLY DIPHTHERIA-NOTIFICATION INDICES PER 10,000 LIVING AT AGES UNDER 15

Urban group	Quarters					
	1938–39			1939–40		
	4th	1st	2nd	4th	1st	2nd
London County	89	65	52	39	38	37
Group of—						
"Evacuation" towns ..	84	78	58	52	46	49
"Reception" towns ..	37	50	25	49	23	21
"Neutral" towns ..	104	74	53	74	65	63
126 great towns	83	69	50	50	44	45
Remainder of England and Wales	117	97	60	112	74	68

notwithstanding the transfer of children and school closure in the "evacuation" areas during these months. In the year from mid-1938 to mid-1939 the average rate was 28, and in the year from mid-1939 to mid-1940 it was 25; so one out of every 4000 children under 15 continues to die annually in the towns of a disease which could be prevented by inoculation.

In Greater London the average index in the period from October to June, 1939–40, was 13, compared with 17 in the corresponding period of 1938–39. In the "neutral" areas the average index for the three quarters was 34, compared with 36 a year earlier. In the "evacuation" areas outside Greater London the quarterly rates from October to June were 31, 37, and 24, compared with 34, 37, and 29 a year earlier, giving no evidence of any effect either of school closure or of the transfer of children. In the "reception" towns the corresponding quarterly rates were 23, 17, and 14, compared with 26, 26, and 20 a year earlier, the death-rate being appreciably lower in the first half of 1940 than in 1939.

Table III compares the quarterly indices obtained by dividing 90% of the notifications (the estimated proportion at ages under 15) by a fourth of the estimated mean population of children under 15 during the quarter in London, the 126 great towns, and the three groups of towns used in table I.

The six months October–March being compared with a year earlier, in London and the other "evacuation" areas the proportion of children notified for diphtheria was lower by about half during this period of school closure, whereas in the "neutral" and "reception" towns here included it was lower by about 20%; but in the June quarter the rates both in the "evacuation" and in the "reception" groups were 16% below the

2. A slight source of error in the comparison between evacuation and reception areas is the fact that most of the children transferred were of school age. In 1938 the national death-rates from diphtheria at 0–5 and 5–15 years of age were respectively 36 and 29 per 100,000; so a 50% increase in the child population at 5–15 would depress the expected rate at 0–15 by about 2%. This correction is unimportant for the present purpose.

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previous year's level. This suggests that school closure led to a reduced notification of diphtheria, although there was no corresponding reduction in the death-rate. The rise in the "neutral" rate in the June quarter was due to a considerable epidemic in one town. The "reception" towns showed an increase in the notification-rate in the December quarter, but this was not accompanied by an increased death-rate and was followed by a considerable fall in the March quarter.

TABLE IV—QUARTERLY SCARLET-FEVER NOTIFICATION INDICES PER 10,000 LIVING AT AGES UNDER 15

Urban group	Quarters			
	1939		1940	
	1st	2nd	1st	2nd
London County	84	92	49	45
Great towns of outer ring	101	104	39	41
Great towns outside Greater London—				
"Evacuation" areas ..	99	99	45	48
"Reception" areas ..	95	86	66	59
"Neutral" areas ..	117	104	60	58
126 great towns	100	99	52	51
Remainder of England and Wales	147	140	128	104

SCARLET FEVER

Scarlet-fever notification indices, obtained by dividing 90% of the notifications (the estimated proportion at ages under 15) by a fourth of the estimated mean population under 15 during each quarter, are given in table IV. The rates in the "reception" towns in both quarters were 31% below those of the previous year, whereas in the "evacuation" towns the decline was 54% in the March quarter and 52% in the June quarter, and in London 42 and 49% respectively. The fall was greater, therefore, in evacuation areas; and, in contrast with diphtheria, it was maintained after the reopening of the schools.

MEASLES

Table V shows the half-yearly deaths from measles in Greater London and in groups of great towns from 1936 to mid-1940 (four towns being omitted which were not included in the list of great towns until after 1936). No correction for transfer of deaths of non-residents has been made from September, 1939, and the numbers during the last two half-years may be slightly overstated on this account. In Greater London and some of the large industrial towns a biennial periodicity of measles epidemics has been the general rule in recent years, and comparison is best made with corresponding periods two and four years previously. On this basis of comparison Greater London deaths in the first half of 1940 numbered 5, compared with 339 in 1938 and 860 in 1936; in the "evacuation" areas outside Greater London they numbered 37, compared with 400 in 1938 and 707 in 1936. In the "neutral" towns there were 57 deaths in the first half of 1940, compared with 183 and 188, and in the "reception" towns 29, compared with 32 and 79. The percentage reduction in measles deaths compared with the first half of 1938 was, therefore, 98% in Greater London, 91% in the other "evacuation" towns, 69% in the "neutral" towns, and 10% in the "reception" towns. Reopening of the schools in the second quarter of 1940 in the "evacuation" towns was accompanied by an increase in deaths (from 13 to 24), whereas in the last two groups of towns where schools had remained open for the most part there was the usual seasonal decline (from 52 to 34).

TABLE V—HALF-YEARLY DEATHS FROM MEASLES

Year	Half-year	Greater London	Great towns outside Greater London					122 great towns
			"Evacuation" areas	"Reception" areas			"Neutral" areas	
				A	B	Total		
1936	1st	860	707	32	47	79	188	1756
	2nd	42	86	1	10	11	56	188
1937	1st	19	175	15	12	27	75	295
	2nd	25	242	7	10	17	38	322
1938	1st	339	400	14	18	32	183	926
	2nd	19	28	4	5	9	16	69
1939	1st	5	58	4	4	8	39	109
	2nd	1	24	–	7	7	21	53
1940	1st	5	37	13	16	29	57	126

Measles was made notifiable in November, 1939, and table VI shows the indices in the first and second quarters of 1940, obtained by dividing 97½% of the notified cases (the estimated proportion at ages under 15 [3]) by a fourth of the estimated mean populations of children under 15 during the quarter. In London this index was 68 per 10,000 children in the March quarter, and 46 in the June quarter; in the great towns of the outer ring of London the indices were 95 and 74; in "evacuation" towns outside Greater London they were 62 and 250. Reopening of schools did not precipitate the expected epidemic in Greater London so late in the year, but in most of the industrial areas of the north and in some Midland towns notifications in the June quarter were greatly in excess of those in the March quarter. Examples of the numbers of notifications in the successive quarters are: Manchester–Salford 265, 2537; Liverpool–Bootle 441, 1420; Newcastle–Gateshead–South Shields 157, 764; Leeds and Bradford 273, 1125; Nottingham 123, 1337; and Derby 21, 413.

TABLE VI—QUARTERLY MEASLES AND WHOOPING-COUGH NOTIFICATION INDICES PER 10,000 LIVING AT AGES UNDER 15, 1940

Urban group	Measles		Whooping-cough	
	1st quarter	2nd quarter	1st quarter	2nd quarter
London County	68	46	23	12
Great towns of outer ring	95	74	13	17
Great towns outside Greater London—				
"Evacuation" areas	62	250	21	26
"Reception" areas—				
Group A ..	545	636	48	45
Group B ..	624	250	34	53
Total	587	482	40	49
"Neutral" areas ..	366	805	32	43
126 great towns	217	375	26	31

In the "neutral" towns the measles index in the March quarter was 366 per 10,000 children—six times as great as in the "evacuation" towns—and in the "reception" towns it was 587—nine and a half times as great. In the June quarter the "neutral" index rose to 805—more than three times that in the "evacuation" towns—and the "reception" index fell to 482.

WHOOPING-COUGH

Whooping-cough deaths are shown in table VII (without correction for transfers since September, 1939, and therefore possibly overstated to some extent in the last two half-years). The whole year from mid-1939 to mid-1940 being compared with the three previous years, Greater London and the "evacuation" towns had a total of 168 deaths, compared with 754, 657, and 503; "neutral" towns had 75, compared with 195, 114, and 131; and "reception" towns had 44, compared with 73, 24, and 61. As in the case of measles, there was, therefore, a great reduction in whooping-cough deaths in "evacuation" areas and a much smaller reduction in other towns. The combined effect on the death-rate from measles and whooping-cough of the closure of schools during the winter and dispersal of children appears to have been favourable in the towns, even when full allowance is made for the progressive downward trend of the death-rate in recent years.

3. In St. Pancras, 1924–27, 97·5% of 6605 notifications were for children under 15.

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TABLE VII—HALF-YEARLY DEATHS FROM WHOOPING-COUGH

Year	Half-year	Greater London	Great towns outside Greater London *					122 great towns
			"Evacuation" areas	"Reception" areas			"Neutral" areas	
				A	B	Total		
1936	1st	315	364	10	25	35	140	820
	2nd	107	157	8	12	20	103	378
1937	1st	232	258	23	30	53	92	616
	2nd	108	174	1	6	7	44	329
1938	1st	107	268	5	12	17	70	458
	2nd	48	90	5	14	19	32	186
1939	1st	164	201	13	29	42	99	477
	2nd	62	64	5	8	13	33	162
1940	1st	3	39	22	9	31	42	115

* Excluding three towns which were added to the list of great towns after 1936.

Whooping-cough notification indices per 10,000 children under 15 (table VI) in the great towns as a whole were 26 in the March quarter and 31 in the June quarter. In the "evacuation" areas they were 21 and 26 respectively, in the "reception" areas 40 and 49, and in the "neutral" areas 32 and 43. It is difficult to explain either this or the corresponding rates of measles incidence otherwise than by the removal of the schools as centres of infection during the winter in the "evacuation" areas and the intensification of infection, perhaps aided by lower levels of general immunity, in the "reception" towns. New York, however, has also had in 1938–40 the rare experience of two successive winters of low measles prevalence, so the possibility of other explanations must not be overlooked.

CEREBROSPINAL FEVER

Table VIII gives the quarterly notification-rates among civilians for cerebrospinal fever per 100,000 of the estimated population during the March and June quarters of 1940, with the death-rates (corrected for transfers) at ages under and over 15 and deaths per 100 notifications during the March quarter. The incidence, as measured by the number of civilian notifications in the quarter divided by a fourth of the estimated population at risk, increased in England and Wales from about 3 per 100,000 in the December quarter to 43 in the March quarter. In the Greater London towns the rate was 31,

TABLE VIII—CEREBROSPINAL-FEVER NOTIFICATIONS IN THE FIRST TWO QUARTERS OF 1940 AND DEATHS OF CIVILIAN RESIDENTS IN THE FIRST QUARTER

Urban group	Notifications per 100,000 estimated civilian population		Death-rates per 100,000 civilians in 1st quarter		Deaths per 100 notifications in 1st quarter
	1st quarter	2nd quarter	Ages under 15	Ages 15 and over	
London County ..	31	29	33	4·8	23·1
Great towns of outer ring			22	3·4	
Great towns outside Greater London—					
"Evacuation" areas	47	52	36	5·7	25·6
"Reception" areas	68	43	39	8·6	22·5
"Neutral" areas	45	40	26	6·5	23·7
Other urban areas ..	44	33	—	—	23·4
Rural districts ..	39	30	—	—	24·7
England and Wales	43	37	—	—	24·0

and in the "reception" towns it was 68, but in the other groups of areas shown in the table the rates did not appreciably differ from that in the country as a whole. The death-rate among children under 15 was 39 per 100,000 in the "reception" towns, compared with 36 in the "evacuation" towns, 33 in London, and 26 in the "neutral" towns. At ages over 15 the increase in the death-rate in the "reception" towns was relatively greater, the rate being 8·6, compared with 5·7 in the "evacuation" towns, 4·8 in London, and 6·5 in the "neutral" towns. The ratio of deaths at all ages to notifications did not vary appreciably from the England and Wales figure of 24%. It is evident that during the March quarter both the incidence and the death-rate of adults were higher in the "reception" than in the "evacuation" towns, but the death-rate of children was not sensibly higher. In the June quarter the notification-rate fell from 68 to 43 in the "reception" towns and declined also in areas outside the great towns, but in Greater London and the "evacuation" towns it scarcely changed.

The percentage age-distribution of the deaths for each sex during the March quarter in England and Wales was as follows:—

Age-group	All males	Females
0–	14·5	10·8
1–	23·0	20·5
5–	13·7	15·3
15–	23·8	17·2
25–	8·6	7·6
35–	6·7	4·7
45–	5·0	8·8
55 and over	4·7	15·1

The excessive proportion of elderly women is noteworthy. The ratio of deaths at all ages to notifications was high in Yorkshire and low in South Wales, the regional percentages for civilians being: North II 32·3, North III 32·1, East 27·4, Midland I 27·1, North I 24·7, Wales II 24·5, North IV 23·8, South-west 23·4, Midland II 21·3, and Wales I 16·6, compared with 24·0 in England and Wales as a whole.

SUMMARY

(1) The standardised death-rate from all causes was not so high in the March quarter of 1940 as in the severe winter quarter of 1929, but it was above that of any intervening quarter. Several large towns returned very high winter rates.

(2) The adjusted death-rate in those great towns which served as "reception" areas, after a temporary increase resulting probably from the influx of many infirm persons, has fallen relatively to that in Greater London and the "evacuation" towns.

(3) During the autumn and winter, when schools were closed in "evacuation" areas and partly closed in "neutral" areas, the diphtheria notification indices among children in London and the "evacuation" towns were only half those of a year previously, compared with a decline of 17% in the "reception" and 22% in the "neutral" towns, but there was no equivalent reduction in the death-rate. In the June quarter, when schools reopened, the contrast between "evacuation" and "reception" towns disappeared.

(4) The scarlet-fever notification index during the March quarter in the "evacuation" towns was less than half that of a year previously, compared with a fall of 31% in the "reception" towns, and this position did not change when the schools reopened in the June quarter.

(5) Measles and whooping-cough deaths during the March and June quarters amounted in the evacuation towns, as well as in Greater London, to a very small fraction of the numbers in previous years; the "reception" towns showed little change, and the "neutral" towns a moderate fall. The measles notification-rate per 1000 children under 15 in the "evacuation" towns was only 6 in the March quarter, rising to 25 in the June quarter, when the schools reopened, compared with 59 and 48 respectively in the "reception" towns. The whooping-cough notification-rate was half as great in the "evacuation" towns as in the "reception" towns in both quarters, the "neutral" group being intermediate.

(6) The cerebrospinal fever notification-rate at all ages and the death-rate at ages over 15 during the March quarter were higher in the "reception" towns than elsewhere, but this was not maintained in the June quarter.

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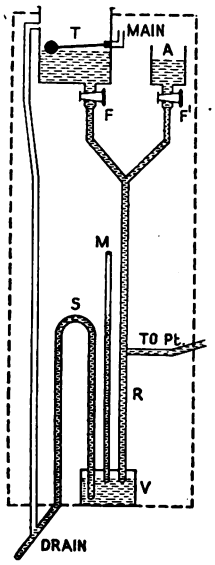
New Inventions

APPARATUS FOR BLADDER LAVAGE

WHENEVER the function of the bladder is impaired, either by abnormalities of the nervous system or by mechanical obstruction to the outflow of urine, lavage through a catheter may be essential in controlling infection. The effect of routine bladder-washes is transient, and the labour involved when a number of cases require treatment is considerable. As a consequence, patients in a hospital can rarely have more than two bladder-washes a day. Some form of continuous lavage would clearly possess considerable advantages over the older methods, and the more nearly this lavage can be made to resemble the normal bladder cycle, the more readily will normal micturition be re-established afterwards. A simple apparatus which enables this to be done easily, and which is equally suitable for use with either a urethral catheter or a suprapubic drain, has therefore been evolved. It has been used on a number of neurological and surgical cases during the past year and has proved satisfactory.



The apparatus (see diagram) can be used for one or more patients. It consists of a closed vessel V from which three tubes emerge: S is a siphon tube connected with the drain, M is a manometer tube, and R a tube connecting to the patient and to the feed tubes F and F¹, T is a tank of water, and A a reservoir of antiseptic fluid—e.g., 1/1000 oxycyanide of mercury, or 1/4000 potassium permanganate. The drippers can be arranged to deliver at about one drop per second, this arrangement being particularly useful when the number of cases to be treated at one time is large. For single cases the tank T and antiseptic reservoir A may be replaced by a simple glass vessel filled by hand.

When working, the top of the siphon limb should be slightly higher than the top of the patient's abdomen. This enables the bladder to fill with both urine and antiseptic solution at the same time. As the pressure in the bladder rises the fluid level goes up until it reaches the top of the tube S when siphoning occurs and the bladder is completely and rapidly emptied. This cycle can be repeated at any desired interval. With a flow of one drop a second emptying will take place approximately every two hours, and this will be found sufficient for most cases not grossly infected. For very infected urines the solution may be allowed to fill the bladder more rapidly. It should be remembered that the antiseptic will be diluted with urine and therefore stronger concentrations may be employed than are usual in the simple manual bladder-wash.

JOHN SHONE,
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Reviews of Books

A Textbook of Bacteriology

(3rd ed.). By R. W. FAIRBROTHER, D.Sc., M.D. Manc., M.R.C.P. London: William Heinemann (Medical Books). Pp. 451. 17*s*. 6*d*.

THE place of bacteriology in the medical curriculum has always been a problem. What should be taught and when? Probably the best solution would be to include something about the biology of bacteria in the preclinical course, to teach the principles of infection and immunity with systematic pathology, and to leave clinical or applied bacteriology to the final year when the student would be able to appreciate its diagnostic worth in medicine and surgery. This textbook is admirably designed to suit such an arrangement. The early chapters deal with the biology and cultivation of bacteria, and are followed by lucid accounts of infection, immunity and allergy (there is some ambiguity about the meaning of direct contact as distinct from droplet infection). The greater part of the book is concerned with the pathogenic bacteria and viruses, the diseases they produce, and the laboratory methods that help in their diagnosis and treatment. Perhaps the best compliment that can be paid to this section is to liken it to a condensed student's version of Topley and Wilson's larger textbook. The chapter on the staphylococcus contains recent work on the toxins and pathogenicity of that organism, the chapters on diphtheria, tuberculosis and the typhoid-dysentery diseases are particularly good and the review on virus infections has been brought up to date. There are still minor inaccuracies but the book both in its contents and format is undoubtedly one of the best of its kind.

Physiology of Sex and its Social Implications

By KENNETH WALKER, F.R.C.S. Harmondsworth: Penguin Books. Pp. 157. 6*d*.

THE listlessness with which a reviewer takes up yet another popular book on sex is rapidly dispelled in the case of Mr. Kenneth Walker's contribution to the Pelican series. Here is a man with a lively and original mind and style backed by a considerable store of wide knowledge. Against the biological background of sex he sketches in its psychological and social aspects. Provocatively but with great good sense he discusses among other things the marriage and divorce laws, chastity and sublimation, which last he is careful to distinguish from mere substitution. By true sublimation he seems to mean something akin to asceticism possible only to a few rare spirits and often far-reaching in its influence for good. His last chapter on sex and education is particularly worth reading.

Relativity of Reality

By RENÉ LAFORGUE, M.D. New York: Nervous and Mental Diseases Monographs, No. 66. Pp. 92. $2.50.

THESE five essays, which were first published in French three years ago, have interest for others than practising psycho-analysts, although the thesis in each is developed upon Freudian concepts. In a chapter concerning anxiety the author has avoided the more complex aspects of the formation of conflicts within the unconscious, and the translation makes comparatively simple reading. When he deals with the genesis of the need of causality and with the limitations in the use of intellect the author covers more difficult ground but nevertheless remains lucid. This is a considerable achievement on the part of both author and translator.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.—On Oct. 16 the fellows of the Royal College of Physicians of Ireland presented Dr. T. Percy C. Kirkpatrick with his portrait, painted by Mr. Leo Whelan, R.H.A., in recognition of his thirty years' service as registrar of the college. Dr. William Boxwell, president of the college, who made the presentation, referred to Dr. Kirkpatrick's zeal in the interests of the college and his eminence as a scholar of medical history. Dr. Kirkpatrick later read a short history of the Sir Patrick Dun's library, which formed the nucleus of the college's collection of books.

On the same evening an extension to the library, made possible by a generous bequest from the late Dr. William Arthur Winter, a past president of the college, was declared open under the name of the Winter Hall.

The annual election of the officers and examiners of the college was held on St. Luke's Day. Dr. J. Rowlette was elected president, Dr. Victor Synge, vice-president. Dr. Henry T. Bewley was re-elected treasurer and Dr. T. P. C. Kirkpatrick registrar, and Dr. T. G. Moorhead representative on the General Medical Council. Dr. Rowlette, the new president, has been a fellow of the college since 1913. He is senior physician to Mercer's Hospital and King's professor of materia medica in the school of physic in Trinity College. He is also one of the representatives of the University of Dublin in the Senate of Ireland. Dr. Synge, the new vice-president, is physician to the Royal City of Dublin Hospital, and King's professor of the practice of medicine in the School of Physic.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 2, 1940

WAR BABY GROWING UP

IN a war notable for surprises the Ministry of Health has perhaps been called on to face more unexpected situations than any other body. The speedy ordering of the E.M.S. at the outset, which Sir FRANCIS FREMANTLE in the recent debate[1] on the health of the nation described as a monument of prevision, has proved itself in the long run, though it was freely criticised for many months. It was obviously impossible to predict when the alert would be followed by the alarm, though it has probably been easier to foretell the needs created by shelter life, crowding in evacuation areas, dislocation of medical practice and education by a shifting population, and many other aspects of national health which come within the purview of the ministry. Mr. MALCOLM MACDONALD in the same debate gave a confident account of medical services in action and prospect and in a broadcast on Tuesday evening he remarked that the hospitals had taken the war by surprise, not the other way round; but it would no doubt be a mistake to suppose that he is content with things as they are. He could, however, point to a framework on which it should be possible to build, a framework which includes such things as facilities for the investigation and treatment of injuries and disease, the transfusion service (organised by the Medical Research Council) with its rapid progress in the study of methods of blood-storage, and the hope of an effective rehabilitation service. E.M.S. hospital beds are being made available not only to fighting men and civilian casualties, but to munition workers, exhausted mothers and children from the bombed areas, and the chronic sick and the aged. It will need constant vigilance if these very different types of patient are to be so distributed that the care of the injured and the acutely ill is not hampered by the presence of chronic sick in the ward. The shelters provide a complex of urgent medical problems which should take precedence of all others just now. No-one who has read Mr. MACDONALD'S speech can doubt his anxiety to safeguard the physical and mental health of the people, but the magnitude of the task was vigorously impressed on him by Dr. H. B. MORGAN, who was impelled not merely by his own distaste for the voluntary system when he urged that all hospitals should be brought under the control of a single department. His plea that the minister should reorganise local government from the health aspect was well supported. It is our boast that under democracy one service grows naturally out of another as the need for it becomes apparent. This has the disadvantage of a time-lag.

The Ministry of Health, following the democratic principle, established the E.M.S. on the existing hospital service of the country. But can new wine be put into old bottles? Not without some disasters. Unlike the Pensions ministry, the Health ministry had no hospitals of its own and no previous experience of hospital management, nor had it powers of compulsion over the local authorities whose hospitals were brought into the scheme; it has been unwilling to exercise fully powers conferred by the defence regulations. In founding the E.M.S. the experts transferred from the Ministry of Pensions had to choose between building new hospitals and grafting the service on those already existing. From the administrative viewpoint it would no doubt have been simpler to build, but it would have been a piece of grave extravagance, entailing endless duplication. Moreover, in the absence of special legislation, the ministry only had power to act by financing existing bodies. Once this course was taken the ministry participated in the management of every type of hospital in the country—voluntary hospitals, county and municipal hospitals, hospitals under public-assistance committees, and hospitals governed by visiting committees under the Board of Control. Local colour has made the task more difficult. Some counties have few general hospitals of their own and still make do with their public-assistance institutions; others have availed themselves of the privileges open to them under the Public Health Act of 1929. Those which achieved the highest standard in health administration during the years of peace have satisfied most readily the demands of the E.M.S. The representatives of the ministry decided not to displace existing officers, feeling that their terms of service and pension deserved to be respected. But the work introduced by the E.M.S. was often quite different in kind and standard from that to which the hospital was accustomed. In some hospitals special officers were appointed to take charge of E.M.S. beds, but the medical superintendent—with few exceptions—remained in supreme control. The matron also was left in full charge of the nursing staff even where, as was sometimes the case, she held office as master's wife without a state qualification. There are keen, broadminded medical superintendents; there are others not so broadminded. Nor can all the blame be laid on one side; members of voluntary hospital staffs seldom have much liking for bureaucracy. Some of them have tried to carry into public institutions customs of the voluntary system which cannot be made to fit. In this confusion of interests and control it was inevitable that medical education, and to a lesser extent nursing education, should suffer. The ministry, unaccustomed to hospital beds, is equally inexperienced in the needs of medical students. No doubt it was assumed that teaching would just go on. But the teaching of clinical subjects is largely voluntary in this country; it is one of the returns which a consultant makes for the privilege of being attached to a teaching hospital. Under the E.M.S. he has no incentive to voluntary service of this kind, and he can scarcely be blamed if his interest wanes. The fact that many hospitals are still contriving to give clinical training at all comparable with that of the past is a tribute to the generosity and keenness of their teaching staffs.

England in peace is locally governed, a system which has the advantage that the needs of a district are watched by those who live there and are met by local funds. But the municipal hospitals have lost for the time being their local character; their patients are likely to come from any area, to be civilian or military, old people or children. The attempt to run a service embodying the powers both of the ministry and the

1. House of Commons, Oct. 17, see *Lancet*, Oct. 26, p. 526.

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local authorities is not entirely successful. Dual governance makes for multiplication of restrictions and stifles initiative. Other state departments are getting into their stride and health is a large element in home security.

TESTS OF LIVER FUNCTION

THE liver has many functions, too many in fact for most of us to remember, and every year the biochemist invents fresh methods of testing them. Yet the clinician does not appear to be satisfied. Is this because they are all valueless or because the wrong use is made of them? Tests of liver function are needed to detect liver damage either in the absence or in the presence of jaundice. When jaundice is absent any function of the liver could be exploited, and the most convenient procedures are perhaps those which test the power of the liver to excrete bile—the van den Bergh reaction, the icterus index, the serum-phosphatase estimation, and the bromsulphalein-excretion test. Nevertheless, other functions are more likely to be impaired in certain diseases, for example, the Takata-Ara reaction and the plasma-protein estimation have found particular favour in cirrhosis of the liver. On the other hand, where jaundice is present any test based on biliary excretion is likely to be useless, since the colour of the patient is sufficient indication that excretion is impaired. This proposition does not quite cover the case of hæmolytic jaundice, which is however not difficult to eliminate on clinical grounds.

In jaundiced patients the problem is usually to distinguish between toxic and obstructive jaundice. It is, of course, possible that differences in the chemical structure of the bilirubin in the blood may exist in the two conditions, but if they do most pathologists would agree that the van den Bergh reaction cannot be relied on to detect them, and it is evidently preferable to test a function which is independent of excretion. Of the numerous possible alternatives we have most experience in this country of the hippuric-acid test in the form introduced by QUICK[1] in 1933, and the galactose-tolerance test due to the work of BAUER[2] in 1906. The lævulose-tolerance test, the theoretical basis of which is less impressive, has been studied recently in an improved form by HERBERT[3] and by STEWART, SCARBOROUGH and DAVIDSON[4]; and a new-comer to the field, at present purely empirical, is the serum-cholinesterase estimation of MCARDLE.[5] In the first of these, the sodium benzoate may be administered either by mouth or intravenously, but the urinary excretion of the conjugated hippuric acid has to be relied on, thus introducing a further variable. The oral modification of the galactose test has lately been studied by MACLAGAN,[6] using a new analytical method which estimates blood galactose as such. He obtained promising results in jaundice and showed a striking impairment of tolerance in hyperthyroidism which has been the subject of a further paper by MACLAGAN and RUNDLE.[7] A difference of opinion has arisen over the high oral galactose curves which are evidently a fairly constant finding in this condition, for they are ascribed to liver damage by MACLAGAN and his colleagues, but to increased intestinal absorption by ALTHAUSEN, LOCKART and SOLEY.[8] Both groups of workers agree as to the clinical value of the test in hyperthyroidism. The intravenous galactose test is described in this issue by KING and AITKEN, who also determine blood galactose. Their results show a fairly sharp distinction between toxic and obstructive jaundice. KING, HARRISON and DELORY have applied the test to the study of experimental liver necrosis in rabbits, impairment of function being demonstrated in every treated animal. The choice between the oral and intravenous galactose tests appears to depend chiefly on clinical factors. The former is more convenient since it avoids the sterilisation and injection of 50 c.cm. of galactose solution but it is contra-indicated by vomiting, pyloric stenosis and the like.[6] In Graves's disease only the oral technique is known to give positive results. Until the publication of this group of papers it was usual to estimate either urinary galactose or total blood-sugar and the estimation of blood galactose as such constitutes a real technical advance. An essential limitation of any liver-function test in jaundice is provided by the atrophic or cirrhotic changes in the liver which may be produced by prolonged biliary obstruction[9]; some sort of time-limit must be imposed if diagnostic help is expected. Further information is required on this point, but normal galactose function is probably retained for at least three weeks in simple obstructive jaundice, and may sometimes persist for as long as eight weeks.[6] This limitation does not imply that liver damage in obstructive jaundice is of no interest to the surgeon but merely that moderate damage does not necessarily imply a toxic jaundice after a long period.

It is barely possible to perform all these tests on one patient, and progress is most likely to be made if each team concentrates on two tests, one excretory and one non-excretory. The principal need is for the careful correlation of the results with clinical data, particular attention being paid to the duration of symptoms, for it is at present more difficult to interpret the significance of liver damage than to demonstrate it.

NEW ALKALOIDS FOR OLD

FEW are better qualified than pharmacologists to appreciate that arresting apostolic exclamation "Behold, I show you a mystery," for in the realm of pharmacology there are mysteries enough and to spare. The metaphysical relationship that may exist between man and the drugs that he has discovered in nature is a big subject but we may wonder why the active principles of drugs are distributed so unevenly. Opium, for example, contains upwards of thirty alkaloids while ipecacuanha must rest content with one. Many generations of pharmacologists have attacked the opium alkaloids, and they have established the interesting fact that these principles have been blended with due regard to the accepted conventions of prescription writing. They fall into two main groups—the phenanthrenes represented by morphine and codeine, which increase the tone of plain muscle; and the isoquinolines, of which

1. Quick, A. J. *Amer. J. med. Sci.* 1933, **185**, 630; 1939, **6**, 716.
2. Bauer, R. *Wein. med. Wschr.* 1906, **56**, 2537.
3. Herbert, F. G. and Davison, G. *Quart. J. Med.* 1938, **7**, 355.
4. Stewart, C. R., Scarborough, H. and Davidson, J. N. *Ibid*, p. 229.
5. McArdle, B. *Ibid*, 1940, **9**, 107.
6. Maclagan, N. F. *Ibid*, p. 151.
7. Maclagan and Rundle, F. F. R. *Ibid*, p. 215.
8. Althausen, T. L., Lockart, V. C. and Soley, M. H. *Amer. J. Med. Sci.* 1940, **199**, 342.
9. Gibson, W. R. and Robertson, H. E. *Arch. Path.* 1939, **28**, 37.

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papaverine is perhaps best known to the clinician on account of its ability to reduce tone and peristalsis of the intestine and relax involuntary muscle of other viscera. The adjuvant and corrective actions of the opium alkaloids have a certain academic interest, but if we were reduced to using one and only one of them in therapeutics morphine would be the universal choice. It is not, however, the ideal analgesic. The drug has still to be discovered that will abolish pain without producing any unpleasant side-effects. The drawbacks to the use of morphine are dryness of the mouth, loss of appetite, nausea, vomiting (especially in women and cats), constipation, depression of respiratory function, and lethargy, but they are of little moment when one is confronted with a patient suffering from agonising pain. One of its subsidiary actions is of great value when the aim is to relieve pain and promote intestinal quiescence, but such cases are relatively uncommon, and in the ordinary run of practice the side-effects of morphine are a bugbear to patient and doctor alike. Research in the past half-century has aimed at modifying the morphine molecule in such a way that its analgesic action may be retained or even enhanced while its side-effects are eliminated.

DRESER, in 1898, synthesised diacetylmorphine which is twice as powerful as morphine as an analgesic; but the mere mention of its sinister synonym "heroin" suffices to condemn it. Notwithstanding the oft-repeated contention that heroin surpasses morphine in its selective action on the cough centre authorities are agreed that opium or morphine are sufficiently effective in abolishing a useless cough. If it be urged that the side-effects of morphine are absent when diamorphine is used, it may be pointed out that this advantage, depending as it does on the different mode of excretion, can be secured by resorting to methylmorphine (codeine); and that addiction to codeine is almost unknown. Heroin is no longer included in the United States Pharmacopœia, and this is a lead that merits the attention of the British Pharmacopœial Commissioners. Unfortunately codeine has only a weak analgesic action, and there are two disadvantages in pushing the dose. In the first place, it is much more expensive than morphine, and secondly, side-effects resembling those of morphine appear after administering full doses over a period of several days. This is not inconsistent with the statement by MYERS [1] that "the effects of codeine upon the alimentary tract do not deviate much from the normal and would not produce a constipating action"; his conclusions from experimental work are in accord with clinical observations provided that the patient receives small or moderate doses (less than gr. 4 daily).

In recent years interest has centred on other synthetic morphine derivatives and in particular Dilaudid (dihydromorphinone hydrochloride), Dicodid (dihydrocodeinone hydrochloride) and Eukodal (dihydroxycodeinone hydrochloride). These compounds compare favourably with morphine in that they are not so likely to lead to addiction. Their relative strengths as analgesics are only now being worked out by a new technique that has already been noted in these columns,[2] but it seems that these new alkaloids have 75–100% of the effectiveness of morphine. MYERS concludes that "there is no experimental evidence to suggest that the administration of dicodid would ever produce constipation; dilaudid is probably a constipating drug, although this effect may not be so marked as that produced by morphine; small doses of eukodol are not constipating, whereas large doses in certain circumstances . . . may produce a mild degree of constipation." It is clear therefore that we are now in a position to exercise more discrimination when prescribing drugs of the morphine series. If certain side-effects are desired in addition to the analgesic action, morphine is still the drug of choice; if, on the other hand, a purely analgesic action is aimed at, with a minimum of disturbance in other systems of the body, the possibilities presented by the new alkaloidal salts are very attractive.

1. Myers, G. N. *J. Hyg., Camb.* September, 1940, p. 583.
2. *Lancet*, 1940, 2, 167.

THE SPRUE FAMILY

Dr. SAMUEL GEE, in his original description in 1888 of the cœliac affection, emphasised the analogy between this complaint in infants and the cases of tropical sprue seen in those returning from India. Since then there has been much discussion of the relation of cœliac disease to tropical and non-tropical sprue, and the question is not likely to be settled until their causes have been discovered. IZOD BENNETT and HARDWICK [1] have attempted a classification to embrace diverse instances of the cœliac syndrome, characterised by steatorrhœa, tetany and macrocytic anæmia. Although the mechanics of digestion are normal or little altered, foodstuffs are not absorbed; this failure of absorption applies especially to fats and carbohydrates but they consider that proteins, vitamins and mineral salts are also implicated. This unexplained failure of absorption, when it occurs in young patients, results in skeletal deformity, defective growth and infantilism. Prof. ROBERT DUBOIS [2] correlates the clinical aspects with the experimental work of VERZAR of Basle on absorption from the intestine of rats of foodstuffs and growth-promoting substances. The physical processes of filtration and osmosis adequately explain the absorption of some substances while others seem to be subjected to the vital activities of the cells lining the alimentary canal. These cells can be poisoned with monoiodoacetic acid, producing in rats a condition which has many resemblances to the cœliac affection of children and adults. The earlier clinicians considered that fat absorption was defective, the other substances only being affected secondarily, either directly (fat-soluble substances and calcium) or indirectly (substances destroyed when delayed in the lumen of the bowel); but as BENNETT and HARDWICK point out there is in sprue, cœliac disease and the other members of the syndrome a gross interference with the total function of the small intestine. Professor DUBOIS has made elaborate biochemical tests on several of his cases of cœliac disease. He finds that, although proteins are absorbed up to the normal extent, fats, glucose and galactose are not. The disturbed metabolism of phosphorus and calcium, the intermediate metabolism of protein break-down products, the poor absorption

1. Bennett, T. I. and Hardwick C. *Lancet*, 1940, 2, 381.
2. Clinique et physiopathologie des maladies cœliaques. By Robert Dubois, médecin adjoint de la clinique infantile de l'université de Bruxelles. Paris: Masson et Cie. Pp. 350. Frs.80.

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of vitamins and the anæmia are in his view secondary. So far it has not been possible to demonstrate any characteristic lesion. BENNETT and HARDWICK remind us that gastro-colic fistula can produce a comparable deficiency disease. In a case of acute obstruction where the upper jejunum and the ascending colon had been anastomosed, sore mouth, frequent bulky and fatty stools, macrocytic anæmia and tetany occurred. Deficiencies were made up, but cure was not obtained until the continuity of the bowel had been restored. They suggest that cœliac disease, tropical sprue, Gee's disease, gastro- or entero-colic fistula and interference with the intestinal lymph-channels may produce a syndrome dependent on chronic jejuno-ileal insufficiency with consequent defects of secretion and absorption. VERZAR has suggested that these disorders are due to some disturbance of the functions of the suprarenal cortex, but though his theory is based on experiment it has not yet been confirmed by clinical, anatomical or therapeutic observations in man. Clinicians are at present divided between the old toxi-infective theory of causation and that of a deficiency of vitamin B_2.

Annotations

VITAMIN B_1'S PART IN METABOLISM

THE simplest definition of the vitamin-B complex is that it is an assemblage of the water-soluble vitamin factors present in yeast. Yeast is an organism of which each cell is a laboratory engaged in an active form of carbohydrate metabolism, and the fascinating picture which is gradually being drawn shows the B vitamins more and more clearly as essential constituents of the enzymes controlling the key process in carbohydrate oxidation and reduction in both the yeast cell and the animal body. This position is established as regards vitamin B_1, nicotinic acid and riboflavin; understanding of it has perhaps gone furthest in the case of vitamin B_1 because studies with animal tissues in vitro have shown vitamin B_1 to have a specific action. Professor Peters [1] in 1932 was the first to demonstrate that oxidation of pyruvic acid by brain tissue was promoted by the presence of vitamin B_1. Since then he and others have made great progress, and in an article in *Nature* [2] he gives a careful analysis of the existing evidence of the place of vitamin B_1 in metabolism, followed by as complete a synthesis of the whole picture as he feels is justified.

In his work in vitro on the brains of pigeons deprived of vitamin B_1, Peters established the feeble capacity of the brain tissue of the deprived birds to oxidise pyruvic acid, and the efficiency of added vitamin B_1 to correct this enfeebled capacity. That in this process vitamin B_1 functioned as a constituent of an enzyme was made clear through the work of Lohmann and Schuster,[3] who isolated in crystalline form the already known co-enzyme, cocarboxylase, and found that it was vitamin B_1 pyrophosphate. Peters poses several questions still outstanding. Is the vitamin in the animal tissue, as in the yeast cell, only active in the phosphorylated form? What is the distribution of the factor? How is it synthesised by animals and yeast? What exactly does it do in the metabolism of pyruvic acid? The first question Peters answers definitely in the affirmative.[4] and he gives proof that vitamin B_1 in various tissues only becomes active after it has been phosphorylated to cocarboxylase, but it can be transported in the blood in the free form. In optimum conditions one molecule of cocarboxylase can catalyse the uptake of 1500 molecules of oxygen per minute. The evidence that synthesis of cocarboxylase takes place in the liver and brain of animals and in the yeast cell is also accepted, and in the latter case it is greatly furthered by the presence of adenosine triphosphate.

The reactions induced by cocarboxylase in yeast are comparatively simple, acetaldehyde and carbon dioxide being produced from pyruvate, but in the animal the processes involved in the oxidation of pyruvate are much more complicated and acetaldehyde never appears. The exact course of these reactions is not yet clear in spite of much and varied attack, but Peters ends by remarking that "we can at least say that we know much better now why vitamin B_1 is important." This is a very modest estimation of the achievement. Twenty years ago it would have seemed rash to suggest that so soon we should have clear insight into the chemical reactions activated by any known vitamin in its capacity as a constituent of an enzyme. Perhaps it is not rash to hope that in another 20 years we shall have insight into the effect of disorders in these chemical reactions on the mental state. The irritability of fatigue and the insanity of pellagra may alike have their cause demonstrated when the delicate mechanism of oxidation and reduction in relation to the B vitamins as enzyme constituents is fully understood.

1. Gavrilescu, N., Meiklejohn, A. P., Passmore, R. and Peters, R. A. *Proc. roy. Soc.* B, 1932, **110**, 431.
2. *Nature, Lond.* 1940, **146**, 387.
3. Lohmann, K. and Schuster, P. (1937) *Biochem. Z.* 1937, **294**, 188.
4. Banga, I., Ochoa, S. and Peters, R. A. *Biochem J.* 1939, **33**, 1109, 1980.

SODIUM SULPHAPYRIDINE

Sir William Ogsden used to describe numerous ways of treating a condition which had been tried and abandoned, with the remark that he mentioned them simply to prevent valuable time being wasted in their reinvention. Every stage in the development of modern chemotherapy has been in the hands of capable men who have applied critical pharmacological tests to products likely to be of value in medicine. Fortunately, too, there has been a close liaison between the chemist and experimenter in the laboratory and the doctor at the bedside in deciding on dosage and methods of administration. Not all of the preliminary work has, however, been published, and occasionally an old method is resurrected when there is good reason for leaving it buried. Lately Ratish and others [1] have been giving sodium sulphapyridine by mouth, a route that has been tried before and discarded because of the excoriation of the mouth and œsophagus that it may produce. As W. R. Thrower has pointed out [2] the pH of this salt is approximately the same as that of N/10 caustic soda, and though theoretically it should be absorbed from the intestinal tract more rapidly than sulphapyridine itself this advantage is not sufficient to offset its causticity. Ratish and his colleagues do not seem to have noted any local excoriation, though they mention some nausea and vomiting. They treated seven cases of pneumococcal pneumonia with sodium sulphapyridine by mouth in doses of 5 g., and found that an effective concentration of the drug in the blood was attained more quickly than in controls who received equivalent amounts of sulphapyridine, but the therapeutic results seem to have been much the same. The evidence they put forward to support the contention that there is less acetyl sulphapyridine present in the blood when the sodium salt is used is unconvincing, except in isolated cases. Their method of estimating the drug was a reliable one, but they so often recorded levels of free sulphapyridine higher than the corresponding total levels that the accuracy of their work is questionable. Certainly more secure evidence would be required before oral administration could be advised as a routine.

1. Ratish, H. D., Davidson, R. and Bullowa, J. G. *J. Pharmacol.* August, 1940, p. 365.
2. See *Lancet*, 1940, 1, 1090.

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When rapid absorption is essential or vomiting makes it impossible to give sulphapyridine by mouth the sodium salt can be given dissolved in 10 c.cm. of normal saline intravenously, or dissolved in two parts of distilled water intramuscularly. An intramuscular injection must be given slowly and deeply into the muscle, for Thrower has demonstrated the local necrosis that it produces. The salt can only be given subcutaneously if the dose is diluted with about a litre of normal saline and run in at a rate not greater than 200–300 c.cm. per hour, as advised by Taplin, Jacox and Howland.[3] In our issue of Oct. 12 (p. 470) Dr. M. Hunter described two cases of cerebrospinal fever which had received intrathecal injections of sodium sulphapyridine before they came under his care. Both, as might have been expected, developed lower motor neurone lesions of the lower limbs, and the introduction of any of the soluble sulphonamides into the theca is a procedure that cannot be too strongly condemned.

HOW LIQUID PARAFFIN SHOULD BE TAKEN

Now that the use of liquid paraffin is officially discouraged, as it has to be imported from abroad, we may remind our readers that many people who take paraffin overdo the dose and are rewarded by audible borborygmi. The B.P. 1932 dose is ½–1 oz., but if paraffin is taken regularly as an intestinal lubricant one or two teaspoonfuls night and morning is generally sufficient; this adds up to a total of two to four quarts in a year, if Sunday is observed as a dies-non for drug-taking. Its value as a laxative increases with the viscosity which depends on its specific gravity and this in turn on the size of the molecule. The B.P. gives limiting values of C_{16} H_{34} and C_{21} H_{44} with gravities of 0·880 to 0·895, but a product of sp. gr. 0·890 is to be preferred and this is less likely to leak. Leakage can also be avoided by taking paraffin in the form of jelly or emulsion, making sure first that this contains no other laxative, unless that is expressly desired. Attention should also be paid to the proper time to take paraffin; usually it is best taken night and morning, with warm milk if seepage occurs. It generally acts better if taken apart from food. Though it is established[4] that absorption of foodstuffs is not impaired by the use of paraffin, there has long been a suspicion that the regular consumption of paraffin may have a deleterious effect on the intake of fat-soluble vitamins, because of its capacity to take them into solution and carry them unabsorbed out of the body. This would be specially unfortunate when paraffin is used to replace olive or other oil in salad dressings and mayonnaise. Experimental evidence on the matter was however scanty, although Olaf Andersen, for instance, found[5] that paraffin given to humans with large does of vitamin A greatly increased the intestinal excretion of this vitamin. Moore had suggested[6] that it was carotene rather than vitamin A itself whose absorption was thus prejudiced, and later Curtis and Kline demonstrated[7] that the blood carotene level was lowered when 20 c.cm. of liquid paraffin was taken before meals. Recent work from the Arizona agricultural experiment station has now confirmed[8] by reliable criteria that the absorption of vitamins A and D, and possibly also of E, is hindered by the presence of liquid paraffin in the gut. When rats were fed on a diet of natural foodstuffs not very rich in fat-soluble vitamins, the addition of paraffin reduced the liver reserves of vitamin A and lowered the birth-rate and survival-rate of the offspring. The liver reserves of dogs were affected in the same way. A similar result was obtained for vitamin D. When rats and dogs were given a diet to produce rickets, the dose of cod-liver oil needed to protect them from rickets had to be increased about three-fold when paraffin also was given. But while the evidence is thus quite definite, it is certainly not true that all the fat-soluble vitamins are washed out of the body by liquid paraffin; if sufficient of them is given the body will obtain enough in spite of wasting a good proportion. It is well known that rats will assimilate enough fat-soluble vitamins for their needs when given in paraffin and with no fat whatever in the diet. The moral is then that if liquid paraffin is being taken the supply of fat-soluble vitamins must be generous and that the paraffin should not be taken along with food.

3. Taplin, G. V., Jacox, R. F. and Howland, J. W. *J. Amer. med. Ass.* 1940, **114**, 1733.
4. Leigh, A. J. quoted in *Lancet*, 1930, **2**, 992.
5. *Hospitalstidende*, 1938, **81**, supp., 29.
6. Moore, T. *Biochem. J.* 1929, **23**, 803.
7. Curtis, A. C. and Kline, E. M. *Arch. intern. Med.* 1939, **63**, 54.
8. *Tech. Bull. Ariz. agric. Exp. Sta.* March, 1940, p. 373.

THE RICKETTSIAS FURTHER SIMPLIFIED

GRADUALLY order is being established in our knowledge of the many infections caused by the rickettsias. Lewthwaite and Savoor[1] have shown conclusively that the scrub typhus of Malaya is identical with the tsutsugamushi disease of Japan. More recently they[2] have been able to prove that the mite fever of Sumatra is also identical with the Japanese disease. Tsutsugamushi is thus obviously a widespread infection in the Far East and since it was the first to be described its name should take precedence over such terms as mite fever, scrub or rural typhus. Alexander, Mason and Neitz,[3] working at Onderstepoort, have now thrown fresh light on the various typhus-like infections met with in South Africa. In order to compare the types of rickettsias found in that country they obtained the organisms from the blood of a dog with a febrile reaction, from ticks (*Hyalomma aegyptium*) found on a hare (*Lepus saxatilis*), from the blood of a patient with tick-bite fever, from rats, and from ticks (*Rhipicephalus sanguineus*) collected from dogs in Tunis. The morphological, staining and growth characteristics of these various rickettsias were compared, as were the experimental diseases in the guineapig, rat, mouse, rabbit, dog, sheep and ox. Rat typhus could be maintained in the guineapig and rat but not in the sheep, dog or mouse. The rickettsias from the ticks of the hare could easily be passaged in guineapigs, but those from dog ticks in Tunis and from the human case of tick-bite fever produced constant reactions in guineapigs only when cultures from the chorioallantoic membrane of the developing chick embryo were employed. Finally, cross-immunity tests were carried out in guineapigs. These showed that murine typhus immunised against itself and to a great extent against the other four rickettsial diseases. The four other strains, however, produced reciprocal cross-immunity, but did not immunise against murine typhus. The rickettsias thus fall into two groups. In the first is the murine or rat typhus which appears to be identical with that seen in Europe and the New World. The other four strains from South African tick-bite fever of man, from dogs in Tunis and South Africa, and from the ticks on the South African hare are all closely related and probably identical. The question of nomenclature thus becomes important. Since the term tick-bite fever has become well established in South Africa it is difficult to replace it either by the French name "fièvre boutonneuse" or by the American "Rocky Mountain spotted fever." Alexander and his colleagues therefore suggest that these three conditions should all be included in the spotted-fever group while for the causative organism of South African tick-bite fever they propose the name *Dermacentroxenus rickettsi* var. *pijperi* in honour of Dr. Pijper of Pretoria who is the pioneer in investigating the rickettsial diseases of man in South Africa. This departure in nomenclature renders certain additional

1. Lewthwaite, R. and Savoor, S. R. *Lancet*, 1940, **1**, 255, 305.
2. Lewthwaite and Savoor, *Brit. J. exp. Path.* 1940, **21**, 117.
3. Alexander, R. A., Mason, J. H. and Neitz, W. O. *Onderstepoort J. Vet. Sci.* 1939, **13**, 119; Alexander and Mason, *Ibid*, p. 25; Mason and Alexander, *Ibid*, pp. 41 and 67.

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modifications necessary: thus the name *D. rickettsia* var. *conori* is suggested for the rickettsia causing fièvre boutonneuse in North Africa and the Mediterranean zone. Further, the generic name "Rickettsia" cannot be allowed for what are at present called *Rickettsia ruminantium*, *R. bovis*, *R. ovina* and *R. canis*. Since these rickettsias of ruminants and the dog differ both morphologically and biologically from those of the typhus-spotted-fever group, the separation is well merited. The differences in morphology can be easily appreciated by a comparison of the photomicrographs illustrating Alexander and Mason's papers with that given by Schulz [4] in his communication of the discovery of *R. ovina* in South Africa. It is questionable also whether the rickettsias of Australian and American Q fever should not be placed in a separate genus. The general name "rickettsia" and "rickettsiosis" could however be retained since all would obviously be specific genera of the family Rickettsiaceæ.

ASPIRIN ON TRIAL

IN 1937 the citizens of the United States consumed 5,143,672 lb. of aspirin.[5] This works out at 48 five-grain tablets per head of population. If we assume that American infants took a negligible amount, adults must on an average have taken rather more than one aspirin tablet every week, and it is safe to assume that the taste for aspirin here is much the same. Yet recent work has shown that knowledge of the possible harmful effects of aspirin is far from being complete. After taking it patients often complain of heartburn and epigastric discomfort presumably because of liberation of a small quantity of salicyclic acid in the stomach by the gastric hydrochloric acid. Douthwaite and Lintott [6] have shown by gastroscopic studies that particles of aspirin lying on the mucous membrane of the stomach may produce irritation resulting in local hyperæmia and even submucous hæmorrhage, but they deliberately allowed the particles to come into contact with the gastric mucosa. The physician usually prescribes aspirin to be taken after food, and the foodstuff exercises a protective action. Douthwaite and Lintott point out that "if taken after food or with milk, it probably has no deleterious effect." They have also shown that calcium aspirin (which is much more soluble than ordinary aspirin) causes only slight gastric irritation, and there is a good case for recommending that patients suffering from diseases of the stomach should use this or one of the other neutral aspirins when aspirin would normally be indicated.

Various constitutional upsets have also been attributed to aspirin from time to time. Prickman and Buchstein [7] say that aspirin hypersensitiveness is the most common form of drug allergy; they emphasise the disastrous effects of aspirin on sensitive subjects and urge special caution in asthmatics with nasal polyps, and people who have a family history of allergy. They are able to quote four instances of severe reactions among asthmatics which ended fatally. The potential dangers of almost any drug are such that we should not be unduly impressed by rare untoward reactions, and it is not surprising that an allergist should be emphatic about the ill effects of some drugs that the general practitioner regards as eminently safe. Opinions differ, moreover, as to the incidence of aspirin hypersensitiveness. Gardner and Blanton [8] have reviewed the histories of 467 private and hospital patients more than half of whom were asthmatics; they agree that dangerous and even fatal reactions may occur in sensitive persons and advise full precautions in allergic subjects; but they add that not more than 2 out of 1000 are susceptible to aspirin, and violent reactions are even less frequent.

The lot of analgesics is not a happy one. Comparatively recently the corpses of acetanilide and amidopyrine were laid to rest. And now laboratory pharmacologists are beginning to make sepulchral references to the toxicological possibilities of phenazone and phenacetin. Practitioners are justified in defending the humble aspirin, for it remains one of the most useful drugs in their dispensaries.

DYSPHAGIA IN CARDIOVASCULAR DISEASE

THE barium-filled œsophagus is now recognised as of the greatest value in cardioscopy,[1] but there is still little available information as to the effect on swallowing of pressure on the œsophagus from enlargement of the heart or great vessels. In a well-known textbook of differential diagnosis the only cardiovascular causes of dysphagia mentioned are aneurysm of the aorta and dysphagia lusoria, due to compression of the œsophagus by congenital anomalies of the great vessels. This question has now been investigated by Bloomfield [2] who points out that there are five cardiovascular lesions which may produce, or at least be associated with, dysphagia—dilatation of the left auricle, pericardial effusion, aneurysm of the aorta, dissecting aneurysm, and such congenital anomalies as right-sided aortic arch, double aortic arch, and aberrant right subclavian artery. Of these by far the most common is aneurysm of the aorta, and particularly of the descending aorta. Even so, dysphagia is rare in this condition compared with dyspnœa due to compression of the air-passages. Bloomfield points out that severe, persistent dysphagia in a patient with an aortic aneurysm is often of grave prognostic significance, since it may indicate either a false aneurysm or a threatened rupture into the œsophagus. In dissecting aneurysm dysphagia is probably common but is overshadowed by other more distressing symptoms, though Bloomfield suggests that in the differential diagnosis of coronary thrombosis and dissecting aneurysm the presence of dysphagia supports the latter. Reports of dysphagia in patients with pericardial effusion are rare, but when this symptom is present it probably means that the effusion is a large one, for it requires a considerable degree of pressure to compress the œsophagus enough to interfere with deglutition. So far as enlargement of the left auricle is concerned it is only in cases of what Bramwell [3] describes as "aneurysmal dilatation of the left auricle" that one would expect much pressure on the œsophagus. In the course of routine screening of patients with mitral stenosis gross distortion of the œsophagus as a result of pressure from an enlarged left auricle is often seen, but in only a few is there any delay in the passage of barium down the œsophagus, and a very small minority of these complain of any difficulty in swallowing. Bloomfield records such a case, in which dysphagia was a prominent symptom and concludes that in this instance the dysphagia was probably due to œsophageal spasm secondary to pressure by the enlarged left auricle. This question of the extent to which dysphagia is due to direct compression or to spasm of the œsophagus deserves further investigation, for in spasmodic cases therapeutic relief should not be impossible.

1. See Evans, W. The course of the œsophagus in health, and in disease of the heart and great vessels. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 208. 1936.
2. Bloomfield, A. L. *Amer. J. med. Sci.* September, 1940, p. 289.
3. Bramwell, J. C. and Duguid, J. B. *Quart. J. Med.* 1928, **21**, 187.

4. Schulz, K. *Ibid*, p. 287.
5. *Drug and Cosmetic Industry*, 1938, **43**, 27, quoted by Prickman and Buchstein.
6. Douthwaite, A. H. and Lintott, G. A. M. *Lancet*, 1938, **2**, 1222.
7. Prickman, L. E., Buchstein, H. F. *J. Amer. med. Ass.* 1937, **108**, 445.
8. Gardner, E. and Blanton, W. B. *Amer. J. med. Sci.* September, 1940, p. 390.

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Special Articles

ANXIETY NEUROSIS*

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Among the nervous casualties of the last war were many cases with rather mysterious physical symptoms which were eventually correlated with anxiety. During the years which immediately followed the term "anxiety neurosis" passed into common medical use; in fact anxiety neurosis is now in danger of replacing the neurasthenia of the early nineties as a polite portmanteau for almost any mental disease. Some psychiatrists have abandoned the struggle for clarity by grouping different conditions under the heading "anxiety states." In the textbooks the terms "psychoneurosis" and "neurosis" are used, if at all, in a conflicting manner, and one of the latest adopts an entirely new terminology and gives the neuroses and psychoneuroses a fresh description under "merergasias."

In his original paper Freud (1895) clearly set out the symptoms of anxiety neurosis, which included general irritability, an anxious state of expectation, acute anxiety attacks, and what he called anxiety equivalents, which are the somatic symptoms of the neurosis—disorders of the heart's action and of digestion and respiration, tremors and shuddering and so on. He also mentioned vertigo and the development of various fears, which he confined to those concerned with common physiological dangers (fears of snakes or fire, for instance) and fears about locomotion—for example, fear of collapse in the street or an inability to walk unaccompanied. The description is constantly confirmed in practice, but the discussions of the last forty-five years have been so focused on the ætiological aspect of Freud's paper as to put his admirable clinical account of anxiety neurosis in the background.

I am using the term neurosis as meaning a condition presenting mental and physical symptoms for which no organic cause can be found. The word "anxiety" in connexion with neurosis is short for *morbid* anxiety. Anxiety is associated with many conditions of body and mind; it is closely allied to the emotion of fear and the instinct of flight or escape, which can be looked on as normal and fulfilling an essential biological function. Similarly one may speak of normal anxiety; for example, it is normal to feel anxiety if the savings of a lifetime are involved in a financial crash over which one has no control, and such a phrase as "I am anxious to catch the 6.15" is a matter of common speech. Both examples clearly suggest that uncertainty about loss of both the savings and the train arouses the unpleasant emotional feeling that we all know as anxiety. Perhaps one may express anxiety as an emotional state closely allied to fear, accompanied by numerous somatic sensations and aroused especially by situations in which uncertainty and insecurity are prominent.

Anxiety is also seen in certain cardiac diseases, in some states of delirium, in acute and chronic epidemic encephalitis, and as an equivalent or post-paroxysmal phenomenon in some epileptics. It is experienced by patients with phobias (unreasoning fear of cats or inability to cross a bridge, for instance) and in compulsive thinking and acting or obsessions. In my opinion these are better classed as psychoneuroses, with mental causes accessible only to special methods of investigation and incidentally requiring much experience and skill for their successful treatment.

* Based on a paper read at a meeting of the Medical Society of London in April, 1940.

ORIGINS OF THE ANXIETY

Freud originally said that the anxiety of anxiety neurosis was due to sexual excitation without adequate outlet or gratification, and pointed out the frequency of morbid anxiety symptoms in engaged couples, in widows and in partners practising coitus interruptus. He made it appear that frustration of instinctive activity can give rise to anxiety, with its somatic symptoms; as if the instinctual tension, aroused and then denied outlet, found its way into the viscera in some unexplained way. This conception of frustrated instinct as a source of anxiety has always seemed to me useful and practical; but there seems no reason to confine it to the sexual instinct. It can surely be extended to the three groups of inherited behaviour patterns or instincts with which man is endowed—the herd instinct, the sex instinct and the instinct of self-preservation. Conflicts between these instinctive groups include the common one between sex and the requirements of the herd, and the special soldier's conflict between self-preservation and the herd dictates of discipline, patriotism and duty.

In anxiety neurosis the patient's physical and mental symptoms are accompanied by the manifestations of morbid anxiety either in localised attacks or as a constant emotional state. The essential ætiological factors are to be found in his life situation and can be summarised as the result of frustration of, or conflict between, instinctive needs. His account of his condition is often focused on his somatic symptoms; there is a curious lack of interest in the psychic or anxiety element of his story. As a result the examiner may easily miss the emotional factor altogether and the patient is treated for organic disease. The outpatient departments of our hospitals are full of anxiety neurotics, many of them adequately treated by the traditional bottle of medicine. Others, who are not so successfully and easily dealt with, make an extensive tour of the special departments and finally arrive with a bulging dossier of notes at the department of the hospital psychiatrist, whose task is rendered formidable by the chronicity of the condition. One may also be misled by the patient insisting that his condition dates from an infection, an operation or an accident, when in fact these are but secondary factors. Of the infections, influenza is especially hard-worked.

Case 1.—A man of 39 complained of insomnia, palpitations, and crippling attacks of "nerves." He was tremulous, irritable, unable to make up his mind and was on sick leave from his service. He dated his symptoms from an operation for dental extraction undergone after his arrival at home from tropical service three months before. Inquiry elicited the confession that he had taken too much alcohol for some months before his return home. On the surface it looked as if residence in the tropics, alcohol and the dental operation were the principal ætiological factors. At later interviews, however, it was revealed that he had had cause to fear infidelities on the part of his wife, to whom he was devoted. This marital situation was cleared up by frank discussion with both parties and the anxiety symptoms disappeared.

Case 2.—A married woman of 25, pregnant with her first child, fell down a flight of steps in her house. She was put to bed and recovered well. Soon afterwards she began to develop tremulousness, rapid pulse and an unreasoning fear that her baby would be an idiot. On inquiry it appeared that her husband's grandmother lived in her house and took up a great deal of her time and attention, being somewhat senile. The young woman had, not unnaturally, wished that the old lady might die. She felt such thoughts to be wicked and began to fear that an unnatural mother would produce an unnatural child.

Among 21 cases diagnosed as anxiety neurosis, taken serially from outpatient practice at St. Mary's during 1939, there were 11 females and 10 males. The youngest was 19, the eldest 42. They gave the following conditions as the origin of their symptoms: illness, 2; operations, 2; accidents, 3; bereavements, 2; unemployment

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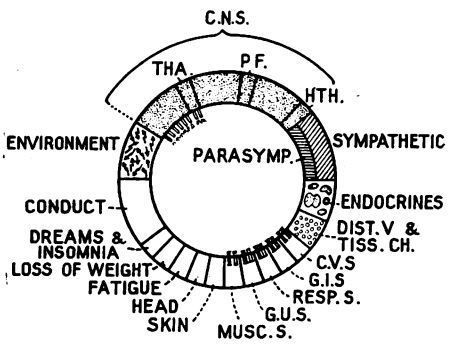
or other economic factors, 2; pregnancy and childbirth, 3; the remaining 7 either made no statement as to the cause of the symptoms or said that they had no idea what could have caused them. The onset of the symptoms was sudden in 9 cases and gradual in 12; 8 out of the 21 turned out to have underlying sexual difficulties; 4 had chronic economic troubles and 2 might be regarded as suffering from communicated herd anxiety as a result of the outbreak of war.

THE PSYCHOSOMATIC CIRCLE

Ross (1923) says that the complaints in anxiety neurosis comprise "all the sensations which the human body is capable of feeling and all the ideas a sane mind can entertain." The figure illustrates not only the groups of somatic complaints but also the conception of the anxiety neurosis as a vicious psychosomatic circle which, once started, acquires a momentum of its own.



The psychosomatic circle. C.N.S. = central nervous system; THA. = thalamus; PF. = prefrontal area; HTH. = hypothalamus; DIST. V. & TISS. CH. = distal vascular and tissue changes; C.V.S. = cardiovascular system; G.I.S. = gastro-intestinal system; G.U.S. = genito-urinary system; MUSC. S. = muscular system.

It begins in the environment by some threat, real or imagined, to an instinctive need, which may be sexual, economic or even national. The environmental factors are appreciated and reacted to by the central nervous system. The autonomic system is next shown (sympathetic and parasympathetic). Then come the endocrine glands of which the adrenals, pituitary and thyroid are of special importance. Changes in distal vessels and tissues are illustrated, because the chemistry of the tissues is altered by autonomic impulses (Kerr, Dalton and Gliebe 1937). We then come to the various somatic systems and symptoms arranged in order: the muscular system, the head as a whole, bodily fatigue, loss of body-weight, dreams and insomnia. We return to the environment by way of various disturbances of conduct, and the whole cycle begins again. So far the figure shows a one way roundabout. But autonomic impulses pass back into the central nervous system from the viscera. This is illustrated by sympathetic and parasympathetic guns, situated in the somatic part of the circle, which bombard the central nervous system with autonomic bullets.

SYMPTOMATOLOGY

The commonest complaints are of palpitations and precordial distress amounting to pain; palpitations and tachycardia are so common that the pulse may be taken in many early cases as a guide to the severity of the anxiety state. Pulse-rates of 100, 120 or more are not uncommon and the cardiac symptoms may be so severe as to lead not only to secondary phobias about dropping dead, but to consultation with a cardiologist in the belief that heart disease is the cause of the condition. The cases of disordered action of the heart which occurred in the last war were not recognised for some time as being emotional in origin. Cassidy (1934) notes that 30% of heart cases seen in consulting practice were what he describes as neuropathic. Whishaw (1936) points out that many patients believing themselves to have heart disease are of the anxiety type and often give a misleading history of infection, such as influenza, operations or accidents. He stresses the dangers of making a diagnosis of heart disease and the necessity for early diagnosis and treatment of the anxiety element. He considers that 10% of cases consulting a doctor for heart symptoms are neurotics.

Gastro-intestinal complaints embrace indigestion, flatulence, constipation, diarrhœa, mucous colitis and something which may be compared to the epigastric sensation experienced by epileptics just before a major attack, variously described as a "boiling sensation," or a feeling of "being on fire" or "full of lumps." Out of the 21 anxiety neurotics in my own series 9 complained of this phenomenon. Other symptoms are capricious appetite, loss of appetite or attacks of hunger. Salivary loss may also be complained of, so that the patient says his mouth is dry and he cannot get his food down. Nausea is fairly common, but vomiting unusual. The most common respiratory complaint is shortness of breath on effort which may amount to a "fighting for air" in acute anxiety attacks. Asthma may be regarded as partly due to anxiety. An unusual symptom is a fixed and immovable pain in the chest, generally on the left side.

The genito-urinary system is rich in anxiety symptoms. Frequency and urgency of micturition are most common, but less usual is retention or even anuria after an acute anxiety attack, or a period of great emotional stress as in war. Other frequent symptoms here are impotence, ejaculatio præcox, spermatorrhœa, dyspareunia and disturbances of menstruation.

The muscular system shows tremors or trembling; in some cases like the war anxiety neurotics it is so severe that the patient will shake his bed and even the floor of the ward. Rheumatic pains are not infrequently complained of and many backaches in both men and women have anxiety as a cause. The tremors may increase when in company and it is common to find a patient complaining of tremulousness and trembling when attending outpatient departments. Associated with the tremors is a general muscular rigidity.

There is an almost invariable complaint of sweating, either confined to the hands or general, especially at night. Blushing or local flushings of the neck or chest, dermographia, patches of "piebald" skin or leucodermia, and "eczema" are common.

For convenience the head is placed separately in the anxiety circle. The usual complaints are of headache, a band round the head, occipital pain or pressure often associated with an "agonising" pain in the neck, frontal pain or pain behind the eyes and sometimes unilateral headache. Pain in the head was complained of by 13 of my 21 outpatients; in 5 it was frontal, in 3 behind the eyes, in 1 in the neck; 1 complained of a thick head, 1 of pressure on the head, 1 of "something inside the head," and 1 said that the head was muddled. Some complain of thoughts racing in the head as if driven by machinery. Ocular symptoms include inability to read for long as the print becomes blurred, spots before the eyes and photophobia. Aural complaints usually consist of buzzing or throbbing in the ears; intolerance of all noise is very common and suggests a true hyperacousis. One woman dated her symptoms from an acute anxiety attack precipitated by the noise of rifle and artillery fire heard during the exhibition of a film. From this time her symptoms led her to avoid all noise, so that she could not listen to wireless or take her dog out lest he should get involved in a fight. Giddiness, a common complaint of the anxiety neurotic, is specially associated with locomotion; the environment keeps steady but the patient feels he or she is about to fall. Many patients will complain that they walk crooked tending to fall to the left or the right.

Fatigue is constant but erratic. It is purposive fatigue for certain chosen activities.

One of my patients was unable to carry on with his work in a factory, collapsed at work with what he called complete exhaustion, and finally lost his job. But he could cycle from his home to St. Mary's and back—about 30 miles. This man was an old anxiety case from the last war, and finally took over all the domestic work of the house and the care of the three small children and sent his wife out to work. Both of them have found it a satisfactory arrangement and it has continued for over twelve years. The man works hard from early morning to late at night without undue fatigue.

Loss of weight is general, especially in long-standing neurotics, the chief reasons for it being capricious appetite, irregularity of meals, loss of sleep, an increased metabolic rate, sweating and occasionally extra exercise taken in the hope of obtaining sleep. It increases the patient's anxiety by supporting his fears that he is

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gravely ill. Old-standing cases sleep moderately well, early cases always present sleep disturbances. The insomnia is usually of the type in which the onset of sleep is delayed; less often it consists of early waking. In both types the sleep is disturbed often by anxiety dreams, which may be described as "horrible" or "terrifying" and wake the patient in a state of panic. Many of these dreams are concerned with ideas of death, accidents or indefinable situations of illness; others exhibit frustration as their principal theme.

A man of 35 dreams almost every night of a cross roads, well-known to him; he is on a bicycle and as he approaches he sees a small knot of people, with police and ambulance men. Bodies with covered faces lie on the side of the road and a policeman walks towards him with uplifted arms, in an effort, the patient concludes, to stop him seeing some revolting sight. At this point his bicycle begins to side-slip and he finds he is riding over a patch of blood. He begins to fall and wakes with a fear that he is going to be drowned in blood. The frustration type may be illustrated by the recurrent dream of a woman of 25. Her dream starts in her own bedroom where she is engaged in packing clothes in a trunk. For some reason it is very urgent that her trunk should be ready quickly, but it is impossible to finish the packing. Either there are piles of garments left over, or the trunk cannot be shut. She wakes in a state of mild panic.

The terrifying dreams of the anxiety cases in the last war often dealt with battle scenes, some of them actual events experienced during the soldier's active service; others, equally real, were experienced by men who had never been engaged in active fighting or even exposed to shell fire. Several of my cases have had terrifying dreams of bombing raids since the outbreak of war.

DISTURBANCES OF CONDUCT

The patient will complain of an inability to concentrate, of forgetfulness and often of a growing inefficiency at his work. He may be irritable at home; the children become a burden and their noise unbearable. Secondary phobias develop, the commonest being a belief that he is going to become insane. Acute anxiety attacks, with fainting or inability to stand or walk, induce the fear of sudden death. These ideas lead to seclusiveness, an avoidance of company, sudden rushes into the street for air or for a long walk; some anxiety patients are found wandering with loss of memory. Primitive racial fears are sometimes prominent, fear of the dark, of fire, of lightning, of knives, of animals like snakes, rats, or birds. Reflection on this unhappy condition will start all sorts of phantasies to explain it; and so the anxiety circle is recommenced. A family man will often worry over the fate of his children, fearing an "insane" father must necessarily produce insane offspring. A woman fears that she should never have married, and dreads the marital embraces of her husband lest idiot children should be born to them. Some patients have a restless desire for constant occupation and distraction, saying: "I am all right so long as I am doing something." Such occupations are seldom carried out efficiently and are repeatedly changed.

Has the anxiety neurotic any justification for his fears of insanity? In my 21 outpatients one woman came from a mental hospital, where she had been sent for investigation; none of the others is known to have become insane or to have required admission to a mental hospital.

Dr. Prideaux of the Ministry of Pensions has very kindly allowed me to see the manuscript of an unpublished work, from which it appears that out of 356 pensioned anxiety cases from the 1914–18 war, only 4 can be traced as having shown evidence of becoming psychotic up to 1937; 1 committed suicide, 1 was found drowned and 2 developed melancholia.

Ross (1936), in a survey of neurosis treated at the Cassel Hospital, states that about 50 patients out of 1186 have become insane, but his cases were not all anxiety neurotics in the limited sense in which I have here described the condition.

Acute anxiety attacks often involve loss of consciousness and collapse in the street.

Mr. Blank, aged 22, a professional player of games, fainted twice at a registry office during his wedding to 20-year-old Miss Blank. He swooned once after saying "I will," and again when the bride made her declaration, and he had to be helped out when the wedding was over. That is a typical acute anxiety attack on an obviously healthy young male; and there is no mystery about the instinct concerned.

Physiologically these episodes seem to be sudden sympathetic attacks with a devastating sensation of panic which often leads to a clouding or loss of consciousness.

The problem of anxiety neurosis in soldiers will certainly arise again during this war. It is useful to recall that the ætiological factor is fundamentally the conflict between the instinctive drive of self-preservation and the herd drive of duty and discipline. Mira (1939) in a paper on psychiatric experience in the Spanish War of 1936–39 describes a severe malignant type of anxiety case to which he gave the name psychorrexis. A few days after admission to hospital these patients showed pyrexia, a black ulcerated tongue and facial twitchings; many died. Fatal cases of anxiety were not recorded in the 1914–18 war, as far as I can ascertain, and these cases described by a psychiatrist of experience therefore possess a special interest at this time.

TREATMENT

Psychotherapy.—The array of therapeutic measures used in the treatment of anxiety neurosis range from neuro-surgery to the patent foods and medicines advertised in the press. Little special psychological training is necessary to detect some frustration or conflict in the three groups of instincts, and the psychotherapy required consists of a methodical and courageous inquiry into the history and circumstances of the patient. This extended history or medical biography has been dignified by the term psychobiology by Meyer and his pupils. Some patients undoubtedly require skilled psychotherapy, especially young adults, whose anxiety symptoms are fired by latent homosexual trends. But psychotherapy cannot be the whole answer to this problem, if only on account of its magnitude. If we take Halliday's (1935) figure of 30% of insured sick persons as suffering from some form of neurosis, and Cassidy's figure of 30% of heart cases seen in private consulting practice as being "neuropathic" in origin, we easily arrive at astronomical figures for the total neurotic sick of England, Scotland and Wales. In 1938 there were approximately 1½ million fresh outpatient attendances in Greater London, excluding children's hospitals and certain special hospitals. It would be reasonable to say that a fifth of those patients had emotional factors underlying their complaints, giving 300,000 neurotic patients in London. Certainly a total of a million sufferers from anxiety conditions would be an understatement for the British Isles. Ten thousand skilled psychotherapists would have to work hard to deal with such a figure in a year. The ideal is for every doctor to become his own psychotherapist, and if he will learn to become his own psychobiologist he will have gone part of the way to attain this ideal. Admittedly it takes time, patience and practice to elicit a full history, but it is remarkable how quickly skill and speed are acquired both by the doctor and his patient.

Drugs.—Unfortunately the patient often takes alcohol to relieve anxiety; I need not dilate on its undesirability. Sedatives and hypnotics like the barbiturates are useful, and an outpatient should always be given sleep if insomnia is a prominent symptom. My own experience favours Medinal or Allonal as hypnotics, with a small dose of bromide or Sandoptal (isobutyl-allyl-barbituric acid) in tablet form if an anxiety attack threatens, especially when away from home. Ström-Olsen and McCowan (1934) report favourably on prolonged narcosis in 7 anxiety cases. I have experience of a single case treated with insulin, a young woman whose anxiety attacks were so severe and led to such disorder of conduct and thinking that a provisional diagnosis of schizophrenia had been made. The anxiety attacks were relieved and she remains well after a year. Somatic symptomatic treatment should not be neglected. The bottle of medicine can be made to do a great deal.

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Anxiety being in the main associated with sympathetic visceral changes, it should, in theory, be possible to find substances either to depress the sympathetic or stimulate the parasympathetic. Many substances have been tried, the most successful being the acetylcholine derivatives, the clinical effects of which have been estimated by Jones (1936) and favourably reported on by Misch (1935). My own experience is mixed; the usual story is that the tablets worked wonders at first, but that their effect was temporary. Bellergal, a mixture of Bellafoline, ergotamine and barbitone, is sometimes successful.

The surgical method of Moniz (1936) consists of partial destruction of both frontal lobes, with section of the prefrontal fibres on their way to the thalamus. Moniz applies this technique to psychotic rather than neurotic anxiety; he notes the disappearance of anxiety after the operation, either from failure of the brain to transmit stresses into the autonomic or an inability to appreciate anxiety by reason of loss of the critical functions of the frontal lobes.

Endocrine therapy.—Freud considered that coitus interruptus was a fertile cause of anxiety. Preparations of glands of animals of the opposite sex have been used with some success. Unfortunately mixed preparations have been given, so that one cannot say precisely what extract has been of benefit. I have no adequate experience of the administration of testosterone or theelin. Thyroid extract should be avoided; there is an increase in the basal metabolic rate of many anxiety neurotics. Occasionally anxiety is diagnosed as thyrotoxicosis, and a partial thyroidectomy is performed with disastrous results (Whishaw 1937, Jones 1937).

Any local sepsis requires treatment in the neurotic as in the healthy. Sepsis may lower bodily health and encourage frightened thinking about the body, so that the threshold of anxiety is lowered and symptoms, normally compensated, appear.

SUMMARY

In the ætiology of anxiety neurosis, environmental factors involving frustration of or conflict between instinctive needs are of primary importance.

The mechanisms and symptomatology of the anxiety neurosis can be pictorially presented as a vicious anxiety circle.

Treatment consists of a systematic attack on that circle.

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HYSTERIA REVIEWED

IT is normal to want to get out of a tight or otherwise uncongenial place; the hysteric manages to do it by exaggerating normal protective mechanisms. Dr. Alexander Kennedy, in an analysis of the origin and prognosis of recent hysterical states [1] describes them as a flight into activity, non-realisation or incapacity. We all know the flight into activity, of which Nero provided the classic example: the anxious performance of some trivial task as a means of avoiding direct realisation of a disaster. The hysteric is able to prolong this defence beyond normal limits. Flight into anger is a variant of flight into activity, which again we all know from experience; the man who snaps at the office-boy because his chief has annoyed him is employing it, and in war it has obvious uses. Again, it is common not to grasp the full meaning of a disaster at once; the hysteric prolongs this momentary bewilderment into twilight states and stupors or loss of memory. Non-realisation may subsequently be replaced by some more permanent protective symptom (the flight into incapacity), the patient emerging from a twilight state to find himself under the wing of a brand-new disability such as aphonia, paralysis or forgetfulness. He does not recognise that his symptom has taken him out of the arena and granted him that freedom from responsibility which is the privilege of the invalid. Kennedy finds that the amount of anxiety accompanying the symptom is a useful guide in assessing the prognosis. Normal anxiety is present when a man prepares to take a decision or face a situation; if the decision is not surely made his state of conflict is perpetuated, and the pathological anxiety produced is most severe when the conflict involves the instincts of self-preservation, reproduction, or the herd instinct with its complex codes of honour and duty. One way in which a hysteric can escape his conflict is by taking permanent refuge in an incapacitating symptom, accepting the limitation of his life which it involves, and deliberately regressing to the dependent state of a child. When this happens the famous *belle indifférence* appears and the outlook for recovery is poor. The man who is not willing to accept a dependent state has a better chance of recovery; anxiety is among his symptoms though he may conceal or deny it, or it may be masked as aggression. The prognosis also depends on the degree of stress to which the patient has been subjected and on his powers of adaptation to the ordinary demands of life in the past. Kennedy considers that however phlegmatic a man may be circumstances can arise to cause him anxiety past bearing; variations in resistance are wide, but everyone is a potential hysteric.

The clinical appearance may be the same whether the patient is a previously normal man who has taken temporary refuge in a disability under an extreme strain, or a man in the process of developing chronic hysterical invalidism. The patient who has a past history of competent endeavour has a better prognosis than one who has led an aimless life with no central interest or ambition. Hysteria develops more readily, too, in those with a native handicap, whether it is a physical disability or a poor or abnormal mentality. The chronic hysteric is facile, childish, self-important and shallow, but these characteristics may also appear in the recent hysteric and may alter with relief from strain. "In the patient's interest" Dr. Kennedy says "he must be seen at his best." He urges that treatment and investigation should be intensive until it becomes certain that chronic hysteria is inevitable, after which the aim can only be to improve the patient's adjustment to life without hoping to alter him. He finds that relatively few cases of recent hysteria become chronic and that only a small number of these become complete dependants. The ultimate prognosis is not too bad—for the patient. Lifelong neurosis will be less of a handicap to him than to those on whom he is dependent.

Treatment aims at allowing the patient to gain insight into the origin of his condition and to readjust himself in the light of that insight. Patients showing acute reactions often need very little help, except to be steered away from further retreat when the symptoms subside. Kennedy considers that incapacitating symptoms must be removed early lest the habit of invalidism develops, and this to some extent directs the order of treatment. It falls naturally into the stages of rest and reassurance, removal of symptoms and therapeutic exploration. The symptoms of all cases of recent hysteria would probably disappear if the patient was removed from the situation which caused them; but as the mere removal of symptoms is not the object of treatment, rest and reassurance are only useful as preliminaries, and to allay the exhaustion which usually contributes to states of non-realisation. If anxiety—showing itself as nightmares, somnambulisms or anxiety attacks—is prominent the patient will benefit by prolonged narcosis, as Mira found. As soon as rest has improved his resistance it is necessary to remove the symptoms. If possible this is done by persuasion rather than suggestion; the patient is "seen frequently and allowed to discuss his condition

1. *J. Ment. Sci.* September, 1940, p. 988.

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until he develops insight with as little interpretative interference as possible." If, however, he appears likely to cling to his symptoms, a few dark hints should be dropped, giving the impression that cure is inevitable and that the doctor can produce it when he likes. With some symptoms which form a barrier between doctor and patient—such as aphonia or amnesia—suggestion may be necessary from the start; hypnosis may provide a rapid and convenient way of dealing with them. Where persuasion has been tried for some time and has failed suggestion of an impressive kind may be necessary. Kennedy advises the physician to become formal and distant, seeing the patient seldom and briefly and letting him feel that his cure is certain. When he seems sufficiently impressed a date is fixed and the symptoms are removed by simple demonstration and re-education, or by whatever method of suggestion seems most appropriate to the case. But, as Kennedy repeatedly points out, removal of symptoms is not the cure of hysteria; the patient must be allowed to gain insight into their causation and this is the last and most important phase of treatment. As he gets a clearer view of the facts the patient often finds himself faced with a decision, and he will try to get the doctor to make it for him. If he is to make a full recovery it is essential that he should get no advice; he must make his own decisions. And when he develops a decided attitude to his problems he is getting fit to return to normal life.

In England Now

A Running Commentary by Peripatetic Correspondents

"LOOK in any time you're passing," said my patient over the telephone. "No hurry." A day came when I found myself in his neighbourhood with an hour to spare so I turned into the main road that passes his house. It is a twisty thoroughfare that runs gently downhill for a mile or more, and mindful of petrol restrictions I turned off the engine, slipped into neutral, and hugging the lefthand ledge freewheeled along at a mere 25 miles an hour. Rounding a blind corner I was disconcerted to see the road entirely occupied by two large cars side by side less than a gunshot away, and rapidly approaching. I applied my brakes. The silly ass at the wheel of the outside car tried vainly to cut in again across my bows, and in front of his neighbour. The inevitable happened, and we collided head on. We all three stopped, two of us for obvious reasons, the third out of charity. Water cascaded from our telescoped radiators and blood from my forehead. The opposing driver (curse him) was unhurt, but his passenger had a scalp wound and was so concussed that he didn't know his glutei from his olecranon (as they say in the Army). A passing ambulance took him to hospital and set me down at my patient's house where, my wounds having been dressed, I was given much cherry brandy and an excellent lunch. There is something rather satisfactory about being involved in a car smash in which one is only slightly injured and not at all to blame. To hear the police making sympathetic noises while I made my report was (to me) a rare and refreshing experience. Indeed, were it not that my little car—and incidentally my trousers—are damaged beyond repair I should have no regrets.

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". . . Could two of the nurses appear as lady's maid and kitchen maid for the health drinking scene and in bright dresses at the Farm House wedding scene? Can you get a bit of wire to hang up mistletoe in the centre of the stage for the last scene? I also want a best man; he just sits beside the bridesmaid and walks out with her at the end . . ."

Variety is the spice of life and amateur theatricals are full of surprises. We are accustomed to all sorts of unusual requests and set out happily enough to seek the necessary volunteers. It will not be difficult to secure willing maids, but the best man may be more elusive. Most nice men seem to shrink from this sort of thing; the young house-officer of today refuses to take a chance until he has seen the bridesmaid. But we shall get one before Saturday, for the show must go on. During the winter months we aim at securing for the entertainment of our patients two evening concerts apart from one film show (provided from our own welfare fund), and occasional afternoon talks, more or less topical. For the evening shows we are largely dependent on the good offices of a central county organisation that provides amateur artistes, the hospital supplying such petrol coupons as may be necessary for their transport. The concert parties that come to us are of varying hues and qualities. Some are visitors at regular monthly intervals and can be counted on to maintain a high general level of performance—songs, violin solos, sometimes a bit of conjuring, occasionally a much-appreciated dance band. Others, though well-meaning, are not quite so happy, and our patients have developed a technique of their own for dealing with shows that do not appeal to them; they do not hesitate to leave the meeting and once or twice the house has been embarrassingly thin before the close.

We have experimented in the production of concerts by the patients themselves. The advantages of patients' concerts are that they may ultimately entertain and that they may keep the patients busily engaged for many hours at rehearsals. That at all events is the theory, and our first concert of the type was a great success. It was schooled and fathered by an officer patient, whose talents lay that way and whose only disadvantage was a tendency to do things rather in the grand manner. The show was good though the knocks were hard; there was a matron full of recognisable mannerisms, if a fondness for punch; a lady resident who would study patients' eyes in preference to their feet; and a physician who seemed to answer to "get them up quick, Peter." Our second essay was not so fortunate. It was sponsored by a lad whose entertainment value was rather less than he thought it was and his troop lacked the sparkle of the first, though the show was noisy enough. The same crowd wanted to give a second performance a day or two later but fortunately it was possible to send the ringleaders away to an auxiliary hospital before it was too late. By comparison nurses' concerts are quiet and seemly, with a fine sense of decorum.

* * *

Sometimes our entertainments take the form of plays by amateur organisations from neighbouring county towns, or by a professional party from the repertory theatre twenty miles away, sometimes a surprisingly successful unsophisticated performance such as an exhibition of dancing by young children. We are occasionally fortunate enough to have a visit from an outstanding personality of the stage, and for a time we have had a series of afternoon talks on a variety of subjects all based on recognition of the fundamental truth that what our patients need is not so much education as recreation. These talks have been catholic in scope and have dealt with mountaineering, Turkey, the Highlands of Scotland, the garden of Eden, science and the war. One learned knight, who came to talk about nothing in particular, introduced a miscellaneous collection of stories with a tale about a nurse of his acquaintance who in some campaign had bestowed upon her by the Emperor of Siam the Order of Chastity, third class; he went on to define the female of "bachelor" as "a lady in waiting." But the highlights of our entertainment world are undoubtedly the ENSA concerts that descend upon us like manna from heaven at three or four weeks' intervals. No beating up of audiences is required for these affairs, for the concerts are invariably well received if occasionally embarrassing for some of the staff, who have found it prudent to avoid the front row since a ponderous blonde made a threatening descent on them from the platform. One of our most lingering and pleasant recollections of that evening is of our senior surgeon, respectably married, shifting uneasily from foot to foot and assuming the pinkest of pink blushes in the fear that the worst might befall him, what time the anæsthetist with his usual high sense of propriety presented a haunted, worn expression from recognition that he could not edge his chair away sufficiently far from the threatened area.

Every concert brings its vote of thanks and it is one of our constant efforts to induce other members of the staff to assume a duty for which no-one has much enthusiasm. Sometimes the performance throws up an incident that serves as a peg for the few necessary

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sentences, but often these descend to pious platitudes. It is particularly difficult to keep on paying suitable homage to regular visitors and in these circumstances a colleague's administrations can be doubly blessed. After the concert, tea and sandwiches for the artistes—lemonade for the more juvenile—and a chat that tries to make it clear to them that we really do appreciate their efforts, for there can be no doubt that our patients look on these concerts as landmarks in the hospital week.

* * *

Looking back through my diary I find that Trafalgar Day 1939 was spent in an atmosphere of the sternest endeavour. Among other activities I examined 100 pairs of feet for flatness and their attendant legs for varicose veins. I also injected their owners with T.A.B. and tetanus toxoid. In the evening England expected me to attend a troops' dance in the Drill Hall which was crammed to suffocation and hot as Gehenna. Included in the company was a wide-eyed baby lying in its mother's arms staring at the jazz band, in full swing only a few feet away, and apparently undismayed by the surrounding racket. To this party I had invited any members of the nursing staff of the local hospital who cared to come and six of them turned up. To find partners for the whole convoy proved an impossible task, but they all liked gin and cigarettes. With vigour, if not with skill, I danced with each in turn in the strictest rotation and took them all home at the end vowing to myself that never again would I be a squire of dames. Over a final drink in the mess I learnt something of silver foxes from an expert. It seems that they are hard to tame and rarely inspire affection but if they escape and run wild they become twice as fleet as the red fox and no pack of hounds can keep on terms with them for longer than a quarter of an hour. Altogether an eventful and instructive day not to be repeated.

* * *

I went on a life-saving night call last week. Over the telephone a voice said would I go at once to Mrs. Johnson who was "blooding at the nose like two taps turned on"? Stop hæmorrhage at all costs, thought I, being still imbued with a course of first-aid lectures I had been giving. Dashing off in a pyjama-jacket, pumps and no socks, I motored four miles in record time to find the farm completely shut up. I saw at once it must be the other Mrs. Johnson who lives equally far from me in the opposite direction. Eight more miles and I found another dark and silent farm. However, I knocked them up. "Mrs. Johnson?"—"They've moved to Langway." This is the most isolated farm in my district, but off I went. The road got worse; it was pitch black and the hedges met above the car which was tossing about like an invasion barge on a dirty night. Going up a steep hill, I stuck. The lane was so narrow that I couldn't open the door to get out, but I gathered I had taken the wrong turning. I had about a mile and a half to back, and towards the end, with my neck nearly screwed off, the wheels went round and round in the mud and I stuck again. Unable to move either forward or back, I abandoned ship and all immediate hope of finding the farm and set out to walk home. Dawn was breaking as I arrived with bleeding feet. "You've been a long time," said my wife, "was it very serious?" When I said I hadn't seen the case yet she laughed heartily. I took her car, and blue in the face and gasping for breath arrived at last at Langway. They looked a little dazed at my apologies. "Us hasn't sent for darcter." I asked if they knew some more Johnsons, and they managed to recall some "out Changford way," but they didn't think I tended they. The farmer stroked his unshaven chin and said brightly, "Can't be anything serious for certain." I went home and had a bath followed closely by a brain-wave. The first Mr. Johnson, I thought, had left his farm to telephone and I had arrived before he got back. But it was no good. The first Mr. J.'s daughter received me with more blank looks. "Dad heard a car in the middle of the night and said 'twas the military. I spect 'twas you." I gave up the struggle and went home to breakfast. At morning surgery there was a message inviting me to visit Mrs. Thompson who had phoned in the night. Needless to say the bleeding had stopped, and as a point of non-medical interest she hasn't paid her bill since 1929.

There is a lot of psychology in our everyday speech. Take for instance the difference between "listening to" and "listening for." Before the end of the battle of London it may make a lot of difference to the minds of many. We cannot help hearing the noises overhead, but when we do it is much better that we should not start listening to them instead of getting on with our work or going down into our dug-out, but it is when we start consciously listening for them that we are on the way to crack. Subconsciously, perhaps, we are always doing so even when asleep: that may be why when a car accelerates we think it is an air-raid warning. Those cars which have a note resembling the siren remind us how nearly related the psychology of attention is to the physiology of hearing. It is when someone listens for an overhead noise and, having heard it, listens to it to distinguish whether it is ours or theirs that he is beginning to suffer from the battle. Whether his treatment should be in the hands of the psychologist, the neurologist or otologist is not today a matter of moment, for Harley Street is not in commission. Fortunately there is still the G.P. It is a tiresome thing trying to decide whether a given explosion is a bomb or a big gun; this is best decided by having a bomb burst fairly near. A number of people have had the best night for weeks after this has happened. Probably, without realising it, they have been wondering what all the explosions mean. Once they have had a bomb near them they know subconsciously (and in their sleep) that all the other bangs are merely gun-fire and do not warrant their attention.

* * *

Our village is collecting scrap iron. A large heap, which was getting larger every weekend, has appeared on the village green. This has the advantage that all the rubbish in the village is now collected in one spot. We no longer fall over pieces of bedstead, or become entangled in old hoops while on a country walk. I expect the scrap heap also has advantages for the Minister of Supply, but he will lose them if he doesn't soon arrange for its collection. The village children and the evacuees have discovered that one roller skate is an efficient method of transport and that an old wheel makes a good hoop. Pieces of stout wire can be put to many uses and old tin cans make good drums. In fact the scrap iron is rapidly disappearing into the village again, but instead of lying neglected in ditches and lanes it is finding a place among the treasures of the cottage children.

* * *

When that animal which was to become man first emerged from the sea, paused for a few million generations in the neutral sludge between the tides, and scrambled at last to the hard, unyielding dryness of the land, he probably carried with him a yearning for the element that had been his home since he was amœbic. Just as his structure still has remnants of his marine nursery days, just as his habits still show a tidal rhythm, so deep down in the strata of his affections is a love of the sea. Once I knew a man from the Hebrides who got a good job with prospects in the middle of Queensland. He chucked it up after six months, he was getting ill. He'd never been away from the sea before; he longed for it; he heard it breaking in his dreams; and it was the most primitive appeal of all, except one, that finally broke him down—the insistent call of the senior cranial nerve, the smell of fish.

So in this ship, in spite of her manifold vexations, the noise and the smell and the foul air at nights, there come times of deeper receptivity, at dawn, after a drink, and sometimes suddenly without obvious cause, when one looks out over the face of the sea and feels at one with it and at peace. Sometimes I have got the same sort of feeling with a person of one's own blood, neither of us talking, but perfectly happy in each other's company. I find my mind groping for a phrase. "Peace that passeth understanding" obviously won't do, for that is just what we are trying to do to understand it. "The peace of sameness," "the harmony of similar structure," something like that. Or perhaps we should employ a more hackneyed simile—the sea, our mother, whence we came, and incidentally to whom we have quite a sporting chance of returning.

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Parliament

THE principal item of business in a quiet parliamentary week has been the introduction and passage through all its stages in the House of Commons of the bill to prolong the life of the present House for a year.

Mr. HERBERT MORRISON, the new Home Secretary, was really pushing an open door when he appealed for general support for the measure. Members of all parties fully realise that a general election in the midst of a world war is impracticable. Mr. Morrison made a statement with the authority of the Prime Minister intimating a carefully considered decision which had been arrived at by the Government. An appeal to the electorate must always remain the final constitutional method of resolving the grave issues of national policy. No-one could foresee what circumstances would arise, but it would be the desire of the Government when a general election became practicable to give sufficient notice for the creation of a new register, and that interval would also afford the House of Commons an opportunity to consider questions connected with changes in our electoral policy.

While giving general assent to the principle of the bill there was a disposition on the part of some members to embark upon a discussion of electoral questions, such as a redistribution of seats and the like, but this was cut short by a ruling on the part of the Speaker that these subjects were out of order on a one-clause bill which was confined to the specific purpose of prolonging the life of the present Parliament. The debate, however, was not entirely sterile. Mr. LEES-SMITH expressed the hope, which was very widely shared in the House, that the precedent of 1918, when an appeal to the country was made three weeks after the Armistice, would not be followed at the end of this war.

HOME FOOD-SUPPLIES

Mr. ROBERT HUDSON, Minister of Agriculture, in a statement on our agricultural position, gave the House a reassuring picture of the contribution which the home farmers are making to our national food-supply. The ploughing of an additional 2,000,000 acres increased food production and the number of cattle, particularly dairy cattle, had also been enlarged. We were entering on the second winter of the war with considerably increased reserves of meat. British agriculture was in a well-balanced condition and able to face the demands which next year's campaign would make on food production. Mr. ERNEST BROWN, Secretary for Scotland, in winding up the debate for the Government, said that it was the official policy that milk production must come first. Although it was true that milk production had decreased as a result of last year's hard winter there was good reason to hope that an improvement would take place this winter. He assured the House that the aim of the Government was to secure a maximum of food production required to maintain the health of the nation in war-time. In recent years a great deal of thought had been given to problems affecting the health and strength of the nation, especially on the side of nutrition. Scientific opinion was agreed that among the vital requirements were bread, milk, potatoes, oatmeal, vegetables, and fats. Meat, while desirable, did not fall into the category of vital foodstuffs. No scientist imagined that a nation could be kept healthy merely in terms of calories. Regard must be had to other things and first of all to the habits of the people and the foodstuffs they liked, as well as the things which scientists said were good for them.

SUMMER-TIME IN WINTER

Mr. HERBERT MORRISON gave great satisfaction to the country when he announced that summer-time is to continue throughout the winter.

QUESTION TIME

Evacuation of London Hospitals

Mr. R. W. SORENSEN asked the Minister of Health whether he would consider removing certain hospitals and patients in London and other dangerous areas to places of relative safety.—Miss HORSBRUGH replied: Arrangements have been in operation since the beginning of the war by which a large part of the ordinary work of the London hospitals has been carried on in the outer hospitals, and at the present time the great majority of the acute sick are being treated in outer hospitals. Some hospital beds must be maintained in London in order to deal with casualties and urgent sickness or accidents. The Minister does not at present consider it necessary that comparable arrangements should be made for any other area although he is watching the position. It must be remembered that the hospital accommodation outside the main towns is limited and the beds must be kept clear in the outer hospitals for casualties and service sick.

Later in answer to a question on the evacuation of the old and infirm Mr. M. MACDONALD said: My officers have been in touch with those of the London County Council on this matter for some time and although the difficulty of finding alternative accommodation without prejudicing the interests of the acute sick and of casualties is very great, I have already arranged to move some of the aged and infirm from London hospitals, and hope to arrange to move a large number more very shortly.

Control of Food Prices

Mr. J. MCGOVERN asked the Parliamentary Secretary to the Ministry of Food if he would take steps to fix the price of all essential articles of food and impose penalties for any breaches owing to the substantial increases which had taken place since the outbreak of war; and if he was aware of the discontent among persons of low incomes such as old-age pensioners, and men and women with large families, due to the high prices and varying prices in different areas.—Major LLOYD GEORGE replied: Price control has already been instituted over a wide range of essential foodstuffs, and further commodities will be controlled as and when desirable. It is the constant concern of the Minister to endeavour to provide adequate supplies of essential foodstuffs to the public at reasonable prices, and in some cases subsidies are paid for that purpose.

Vitamins in High-extraction Flour

Mr. G. MANDER asked the Parliamentary Secretary whether, in view of the fact that white bread is very largely deficient in vitamins, and was very often baked with alkaline bleaches, thereby destroying what vitamins remained, he would consider the advisability of arranging for the supply to the public of highly extracted bread enriched with yeast and added vitamin concentrates.—Major LLOYD GEORGE replied: Bread made from high extraction flour is freely available to meet public demand, and the Minister does not consider it necessary to add to the vitamins already present in such flour.

Health in A.R.P. Shelters

In answer to a question Mr. HERBERT MORRISON said the medical officers of health of the metropolitan boroughs were requested in September last to arrange for the regular visiting of public air-raid shelters. The visiting of such shelters (including underground stations used as shelters) by medical officers of the Ministry of Health has also been in progress and is being further developed and systematised. In answer to a further question he added that arrangements for the employment of additional doctors are not yet complete.

Venereal Disease

Captain G. S. ELLISTON asked the Minister of Health if the grant to local authorities of 75% of their war expenditure on venereal disease included expenditure on education and propaganda.—Mr. MACDONALD replied: The grant which I announced in the House is payable towards the capital and maintenance costs of new treatment facilities necessitated by war-time conditions. I have got questions of education under consideration.

Soldier's Mental Condition

Mr. D. L. LIPSON asked the Minister of Labour whether medical boards give attention to the mental health of the men registered for military service in view of the fact that a mental defective had been graded A.1 by a medical board.—Mr. ERNEST BEVIN replied: The investigation of a man's mental condition is an important part of the examination by medical boards and is a matter on which they have recently received further directions on the recommendation of the medical advisory committee under Lord Horder's chairmanship. I am inquiring into the case mentioned.

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Letters to the Editor

SAFEGUARDING SLEEP

SIR,—In your leading article of Oct. 19 you say that "Noise alone does not keep people awake once they have had a little time to recognise that it has no importance for them." Although this is true to a large extent it is not entirely applicable, especially to those of intellectual pursuits. Their sleep is rarely undisturbed, and even in peace-time they are awakened by noises, particularly those of human origin, which have no importance for them. However, this does not affect the main issue that we should do everything possible to eliminate the exhaustion, irritability, and loss of efficiency caused by loss of sleep. In this our profession can lend appreciable help to the effort of winning the war. Officially the only aid which has been offered is the distribution of ear plugs, and, I understand, the issue of aspirin for use in air-raid shelters. Advice to keep the plugs clean and to avoid exchanging them with other members of the family has been omitted. Meatal eczema and boils will result. In fact, even when the greatest care is exercised, the repeated use of solid, or semi-solid, ear plugs leads to these troubles. Clean wool soaked in medicinal paraffin, or impregnated with Vaseline, seems to be harmless.

Aspirin is seldom effective as a soporific, it produces irritation of the gastric mucosa in 80% of people and is not devoid of the danger of addiction.

Most of those we have now to help are normally good sleepers and my opening quotation certainly applies to them. Our task is not strictly comparable to that of treating peace-time insomnia. As you write, it is a matter of taking the edge off anxiety and giving the highly strung (a group which is rapidly increasing) tranquillity and self-confidence. Often we find, therefore, that a rapidly acting and rapidly destroyed drug will ensure a full night's rest. Once an individual has been helped to sleep well in spite of gunfire and bombs often he finds that his power of natural sleep has returned. For the majority, however, some soporific is needed and should be given nightly or every second night.

We have a wide choice of drugs. The ideal preparation should be non-cumulative, of low toxicity, devoid of "hang-over" effects and of propensity to addiction. Such a drug has yet to be found but we have neared the ideal in the urea derivatives—the barbiturates and carbromal (Adalin). Dr. Harris in THE LANCET of Oct. 12 states that most people can take gr. 30 of sodium bromide thrice daily quite easily and this does not leave them with a heavy head in the morning. I will join with Dr. Ling in disagreement with this view, especially if the implication is that such a dosage may be repeated daily. The bromides provide the typical example of cumulation due to slow excretion. This is occasioned by the body's inability to distinguish between bromides and chlorides. Thus a dose of gr. 90 of bromide in one day will require several weeks for its complete elimination. With further medication the stores of this halogen will mount up and such paradoxical toxic symptoms as insomnia, delirium, and hysterical manifestations may arise and possibly end in death. At the least one will expect severe acne and such mental torpor as will render the individual quite unfit for his daily tasks. Gillespie (*Lancet*, 1934, **1**, 337) after a painstaking search of available literature concluded that up to the end of 1932 danger to life from *therapeutic* doses of the barbiturates had not been proved. No reasoned refutation of his critical review has been forthcoming although there can be little doubt that the use of these preparations has increased in the intervening years. Allowing that idiosyncratic reactions do occur, probably in less than 3% of individuals, yet those are usually skin rashes and pyrexia and are not fatal. Should they arise the safe carbromal (excluded from Poison Rules 1935) should be tried. In fact the drug may well be used in the first place, for although it does not produce weight for weight the depth of sleep of the barbiturates it usually suffices for air-raid insomnia. It would be invidious to mention the drugs for which I have preference. No preparation should be chosen which contains amidopyrin. Different barbiturates must be tried out tentatively until the best one is found for each patient. No conclusions can be reached from mere consideration of chemical structure.

My last point is that in therapeutic doses these drugs do not produce such a degree of torpor as to render a person incapable of responding promptly to an emergency. A bomb in the near vicinity, a smell of burning or of explosive, will act like a complete antidote, with the added advantage that once the danger is over refreshing sleep will obliterate the memory of a moment's terror.

Harley Street, W.1 A. H. DOUTHWAITE.

SIR,—I am glad you support so unequivocally the use of barbiturates to obtain sleep and peace during air raids, but I am mystified why you should suggest giving a quick-acting barbiturate like soluble barbitone in small doses three times a day to ensure sleep, for this seems to me to give the maximum of sleepiness during the day and the least chance of effective action at night. Phenobarbitone is rather a different matter as it is clinically much more slow-acting, but in each case I should strongly favour giving the whole dose at night when the maximum sleep-producing action will be obtained, and with phenobarbitone a definite sedative action will be noted on the day following. It seems important that these drugs should be given with a hot drink for rapid action, and some people vary very much in their response even when they take it in this way. In a fairly extensive experience of these drugs over 10 years I have not met any case in which there has been any difficulty in stopping their use when desired. Indeed I have been struck by the number of patients who used to attend for all sorts of ailments who now merely require one of these tablets at night, as their other ailments no longer seem to trouble them.

Winsford, Cheshire. W. N. LEAK.

ASCORBIC ACID AS AN INDEX OF NUTRITION

SIR,—Dr. A. T. Todd in THE LANCET of Sept. 14, referring to my paper on the vitamin-C levels of school-children, asks in effect three questions. (1) Is it certain that scurvy is in fact caused by an insufficiency of vitamin C? (2) Shall we continue to make this substance the sole criterion of dietetic adequacy? (3) Does it really matter if the intake of the vitamin is below the reputed optimal requirement?

(1) It has been repeatedly demonstrated that in scurvy the past diet is deficient in vitamin C, and that the disease can be prevented or cured by vitamin C. It is hard therefore to escape the conclusion that scurvy is a deficiency disease. The suggested analogy between scurvy and vitamin C on the one hand and malaria and quinine on the other is surely false. In malaria an infective agent is at work, whereas in scurvy only a deficiency is known. Perhaps the underlying difficulty is that which has been referred to by Hopkins—the natural bias of the human mind to prefer a "positive agent" to a "minus sign." It is true that Szent-Györgyi once propounded the theory that a second factor, the hypothetical vitamin P, was involved in producing a scurvy-like syndrome. But other laboratories—including later Szent-Györgyi's own laboratory—have been unable to confirm his original experiments, and, as he himself has put it, there must have been some unexplained discrepancy.

(2) Has anyone ever in fact suggested that ascorbic acid should be "the *sole* criterion of dietetic adequacy"? In my paper the very first paragraph specifies "direct tests to determine precisely the level of nutrition as regards each of the several important dietetic essentials." Past work published from this laboratory has been concerned with detecting deficiencies of a number of these factors, including vitamins A, B_1, C, &c. In suggesting a programme for nutrition surveys as long ago as 1936 (*Lancet*, 1936, **1**, 966) I pointed out that tests had become feasible to ascertain the levels of nutrition with respect to iron (hæmoglobin levels), calcium and phosphorus (blood analyses), as well as vitamins A, B_1, C, D (e.g., phosphatase test) and so on.

(3) The third question raises the whole fundamental issue of partial deficiencies. To this day the tacit assumption still seems to be made by some that provided a man is not showing symptoms of beri-beri or scurvy he is therefore having enough vitamin B_1 or C. But there is a wide gap between the amount of the nutrient needed for protection against blatant avitaminosis and that needed to ensure optimal health. Numerous feeding

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experiments on children of the kind Dr. Todd calls for have already been done, and have left no doubt about the improvement in health when suitable additions are made to ordinary working-class regimens. To give all the evidence concerning partial deficiencies is not possible in a letter, but I have summarised some of it in an article in this issue. The assembled nutrition experts of the world, under the auspices of the League of Nations, have defined the daily requirement of vitamin C as 30 mg. per day. This is approximately the amount which has been found necessary to stay a fall in capillary strength in juveniles, or to cure incipient scurvy in sailors. By the saturation test we are able to measure the reserves of vitamin C and say how far below or in excess of the optimal standard a given subject may be, or whether he is approaching dangerously near the level of scurvy. Apparently Dr. Todd believes that the amount of 30 mg. arrived at by the international experts is wrong.

The two arguments produced by Dr. Todd for lowering the generally accepted requirement are (*a*) that in Arctic regions raw seal or walrus flesh is protective, and (*b*) that Rietschel, Schick and Mensching in Germany were able to keep men on a diet low in C for relatively long periods. Both these facts are simply explained. Raw meat if eaten in large quantities gives a reasonable supply of vitamin C. There are examples of its use in polar and other expeditions, and during the last war it was successfully used when alternative antiscorbutics were not available. As to Rietschel and his co-workers we should not be misled by the attempt of certain German writers to persuade their public that their existing standards of nutrition are needlessly high, and that vitamin C is an unnecessary luxury. Rietschel has been answered by Stepp and other physiologists in Germany who have pointed out that "no scurvy" is not the same as "optimal health."

It need occasion no surprise if saturation tests for vitamin C, and tests for other deficiencies, show that an appreciable proportion of the population is below the optimal standard. This is to be expected, bearing in mind the independent evidence reached along other lines (cf. p. 539) about the incidence of malnutrition. It would be a dangerous policy to let reserves sink to zero, on the mistaken assumption that health need not suffer until scurvy appears.

Nutritional Laboratory, Cambridge. LESLIE J. HARRIS.

DEATH AND DYING

SIR,—Professor Ryle in his beautiful essay corroborates the conclusion, which many well-known members of our profession have reached, that the act of dying is usually not in any way so terrible to the dying individual himself as it seems to his friends present at the death-bed.

I referred to the prevailing medical evidence in my "Aspects of Death" and quoted the supporting opinion of such eminent men as Sir Henry Halford, Sir Benjamin Brodie, Sir William Gull, Sir W. S. Savory, Dr. William Munk, Sir William Osler, Sir J. F. Goodhart, Prof. H. Nothnagel, Prof. C. A. Ewald, and I would now add Sir Frederick Treves, Prof. A. E. Hoche, and Prof. G. Perthes. Dr. T. B. Scott (1914) went so far as to write: "The so-called agony of death is, in my experience, a chimera." Dr. M. O. Raven's letter (*Lancet*, Oct. 12, p. 468) leaves me rather indifferent, for I feel compelled to hold that a civilised adult man's sense of duty—and his actions—should not be dependent on whether he believes or not in personal immortality or is agnostic—a question often regarded still as supremely essential for every human being. I am not sure that Dr. Raven and many others are justified in representing Socrates as a convinced advocate for human personal immortality, for (according to Plato's "Apology") after his condemnation to death he said to those of his judges who had voted for his acquittal that he did not regard death as an evil. Death, he declared, must be one of two things: either it was complete annihilation, in which case it was like a dreamless sleep; or else it was a change and migration of the soul, in which case he would have the delight in the other world of meeting and conversing with the just judges and heroes of former times, who would not condemn him to death for questioning them; to a good man nothing could come as an evil, and even death might be a blessing. Surely, Socrates would have agreed with the agnostic sentiment on T. H. Huxley's tomb, that it is well "even if the sleep be endless." I think Socrates would also have enjoyed the substance of Professor Ryle's essay.

Harley Street, W.1. F. PARKES WEBER.

INFANTS IN DAY NURSERIES

SIR,—In his letter of Oct. 12 Professor Parsons deals with the disadvantages of day nurseries especially for infants under nine months. The Birmingham Day Nursery campaign committee recognise these drawbacks and in a circular letter on Sept. 19 they pointed out that the infant under six months is better under the care of its own mother; they much regret that mothers are forced into industry by economic circumstances before the baby is six months old. My experience in general practice shows that the nursing mother is treated with scant sympathy by the approved societies, and sick benefit which would in many cases be sufficient to keep her at home is denied her. In the case of the soldier's wife Professor Parsons must surely realise that the Government allowance is not sufficient to give mothers and children a diet which is not lacking in some of the essentials for good health, and therefore naturally the mother will seek work to supplement this allowance. While the Government is asking more women to enter industry we must at least guarantee that their children shall be given skilled care, a proper diet, and the best possible conditions. Professor Parsons might be convinced of the shortage of women's labour by the following statement made by the local welfare officer: "There is a shortage of women workers in Birmingham and there will shortly be a campaign to get more women into the factories." My committee is convinced that under present conditions day nurseries are as essential to the welfare of the children as any other public service.

M. H. BARROW,
Hon. Sec., Birmingham Day Nursery Campaign Committee.

SIR,—Professor Parsons in your issue of Oct. 12 emphasises some extremely important points. As men are called up they will have to be largely replaced in industry by women. Recently I have examined 1000 women replacing men in a highly skilled job demanding a good standard of health and ability. Of the first 100, 80 are married and 20 are single, and their ages range from eighteen to fifty. They had 59 children between them, the youngest being aged six months. Women of the child-bearing age such as these will have to take an increasing share in the war effort, and it is a matter of national importance and urgency that their children should receive expert care.

Many women when they apply for work ask their employers about nursery facilities for their children when they are at work. Employers are willing to give time off for the woman to make arrangements for the care of her child, but private arrangements are unsatisfactory and the woman has either to give up her job or ask for further days off to make fresh arrangements, and this inevitably causes dislocation in our vital national industries.

With reference to breast-feeding, in peace-time 33% of failures were stated in the Birmingham maternity and child-welfare report of 1938 to be due to anxiety on the part of the mother. In war-time this proportion will increase. With regard to infection, it will be interesting to see whether "bombs or bugs," take the greater toll of life. Here again the young baby would in my opinion be safer under expert care in a proper nursery where defects and illnesses can be quickly spotted.

In total war the child is in as much danger as its father, and the anxieties of the mother have much increased. It seems clear, therefore, that if women are to take their place in industry they can only do so if they are assured that their children are well cared for and happy. The school-children are occupied at school all day, but a necessity exists for more play centres and communal feeding. More nursery schools are required for the toddlers, and nurseries of all kinds in easily accessible places, with well-trained staffs, possibilities of isolation, and so on to meet the needs of the baby, and all this at a cost the mother can afford out of her wages, if industry is not going to be impeded by lost time. For these reasons the establishment of well-equipped nursery schools, and residential and day nurseries is an urgent necessity.

Birmingham. DOROTHY BRENNER.

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SURGERY OF DYSMENORRHŒA

SIR,—Perhaps the unsatisfactory element in the treatment of dysmenorrhœa is due to non-recognition of the fact that it is a symptom and not a disease. If this symptom has an organic basis cure will follow the removal of the cause; without this organic basis local treatment is a thing to be avoided at all costs, and I for one am rather sceptical of the long cervices, small uteri and the rest of the minor abnormalities said to warrant treatment. One meets similar cases with no dysmenorrhœa. It is to be hoped that the medical profession will withstand the pressure constantly exerted by anxious mothers who consider gynæcological treatment necessary for young daughters who complain of dysmenorrhœa. If it is desirable to investigate such a case let it be done under anæsthesia, and let us do all we can to prevent the girl's attention from becoming focused on her pelvic organs. These cases are caused by maladjustment, misunderstanding of sex matters and a sedentary life; they need encouragement of self-confidence and a healthy emotional outlet. Congenial occupation and cheerful companionship will help and the A.R.P. services are probably playing their part in the removal of dysmenorrhœa. On the physical side gymnastics and dancing will probably prove as effective as a curettage and much more lasting in their effects. Even now one frequently meets the suggestion that these girls should "try to get married to see if it will help." The happiness of the unfortunate husband is unlikely to be brought about by a marriage entered upon as a cure for dysmenorrhœa; moreover, if the patient considers matrimony in the same light as a dose of medicine it will probably fail as a cure. A love match is a different pair of shoes and devoutly to be wished; nature, after all, is the most efficient remover of inhibitions.

Kensington. VIOLET RUSSELL.

LUMBAR PUNCTURE IN CEREBROSPINAL FEVER

SIR,—I was much interested in the paper by Williams and Brinton which appeared in your issue of Oct. 19, and I suggest that the diagnostic lumbar puncture done in their cases had a therapeutic action. Probably the withdrawal of even a small quantity of cerebrospinal fluid helps, and one or two lumbar punctures may be the optimum number for a case of cerebrospinal fever treated with sulphapyridine. The following case is of interest in this respect.

A man of 26 felt unwell on Oct. 2; he had pains in the limbs and sweated and thought he had a severe cold. On Oct. 5 he returned to work, but his symptoms recurred that night. On Oct. 11 he complained of headache and stiff neck; he vomited repeatedly. Temperature was 101° F., rising to 103° F. in the afternoon. He was admitted to hospital and I saw him the same day. He had received no sulphonamides before admission, but was cyanosed and severely ill. Temperature 106·8° F., pulse-rate 126, respirations 32. Severe frontal and occipital headache. No neck rigidity, Kernig's sign absent, no rash, no photophobia. Consciousness was clouded. Immediate lumbar puncture released 2 c.cm. of turbid fluid, under pressure. Antimeningococcal serum, 65 c.cm., was injected intramuscularly. Headache relieved slightly. Immediately after lumbar puncture the patient complained of neck rigidity and developed Kernig's sign. Sulphapyridine, 3 g., was given at once by mouth and followed by 1 g. 4-hourly. Within 8 hours his temperature had fallen to 102° F. and his colour was good. Next day his headache was less severe; he had photophobia; temperature 100·4° F., pulse-rate 108, respirations 28. By Oct. 14 he was much improved; his temperature was 97·2° F. He had slight headache and no neck rigidity. His sulphapyridine was reduced to 0·5 g. 4-hourly. On Oct. 16 treatment was stopped; he was convalescent.

I think this patient would have died without the original lumbar puncture. Beaumont and Dodds[1] state that the withdrawal of 5 c.cm. of cerebrospinal fluid lowers the cisternal pressure of a normal person 30–40 mm. Harries and Mitman[2] suggest the withdrawal of a few cubic centimetres of cerebrospinal fluid as the best method of terminating convulsions in a case of whooping-cough. It would be interesting to compare a series of cases treated with sulphapyridine alone with a series treated also by lumbar puncture on one or two occasions. The difficulty of verifying the diagnosis in the cases not punctured should not be insurmountable.

Health Department, Swansea. G. E. DONOVAN.

1. Recent Advances in Medicine, London, 1939, p. 327.
2. Clinical Practice in Infectious Diseases, Edinburgh, 1940, p. 197.

ADHERENT PERICARDIUM

SIR,—I must differ from Dr. T. G. Armstrong when, in his interesting paper (*Lancet*, Oct. 19) he states that the constrictive type of adherent pericardium never occurs in rheumatism. Incidentally, "never" is a hazardous word in medicine. Many years ago at Great Ormond Street I had a boy for months under my care who after a severe rheumatic pericarditis developed the enlarged liver, spleen and recurrent ascites we associate with a constrictive pericardium. I was present at the autopsy which showed the pericardium thickened and completely adherent. The rheumatism had been definite and there was no evidence of tuberculosis. There is another rheumatic form of constrictive pericardium, the result of which I have termed the malignant form of rheumatic pericarditis—a relapsing sullen pericarditis lasting over months. A radiogram can be mistaken for one of pericardial effusion and I have seen an unhappy surgeon burrowing in the adhesions until he opened the heart. Then he stopped. A rheumatic heart enlarged by valvular lesions may also have a constricted, thickened pericardium just as a man may be buttoned up securely in a waistcoat he wore before he took to overeating.

I have seen a number of cases of tuberculous constrictive pericardium. As we know, tuberculosis may cause large and recurrent effusions, but, as Dr. Armstrong points out, may also be a blatant cause of constrictive pericardium. Cheadle taught me this in the last century. Having treated some of these cases for years, from the onset to the end, I wrote about their history in a small book "Heart Disease and Aneurysm" which with all its merits was promptly overlaid by the notable book of Mackenzie and lived but to give a few gasps.

I have no desire to be aggressive but the remembrance of the face of that surgeon seeking for an effusion and greeted by blood from the heart makes me dare to repeat that a rheumatic pericardium can be constrictive, even in the most classical sense.

Bath. F. JOHN POYNTON.

BLOOD SEDIMENTATION INDEX

SIR,—In his excellent article in THE LANCET of June 29 on the sedimentin index Dr. George Day states: "Delay between withdrawing the blood from the vein and setting it up in its column causes a much increased first-hour reading, for during this delay the corpuscles are aggregating into clumps, and, when the tube is finally set up, the maximum velocity is reached earlier." "Eureka!" I cried. "All we have to do is to leave the blood standing for a few hours, then shake it up and we have the maximum velocity of fall from the start." In actual fact this is not the case. Working on these lines I measured a number of sedimentation-rates. With part of the sample of blood I filled a 200 mm. Westergren tube, and kept the remainder for various intervals of time up to 24 hours before shaking it up, either gently or vigorously, and measuring its rate of fall. Graphs were then made of both sets of 10 min. readings, up to 2 hours, but in both cases there was an initial slow fall, followed by the maximum rate of fall, and finally a decreased rate as the cells packed at the bottom of the tube; nor was there any measurable difference between the two sets of readings over any period of the graph. After 24 hours the blood showed a tendency to clot in the Westergren tube. The importance of these findings appears to be that one may safely keep a sample of blood up to 24 hours before measuring its sedimentation-rate and still have reasonable certainty of obtaining the correct result. The temperature at which the rate is measured must obviously be constant, however.

Horton Emergency Hospital. J. S. PHILLPOTTS.

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NEUROTICS IN THE FORCES

SIR,—Dr. Neustatter endeavours to dispose of my letter referring to the prevention of neurosis by the application of "some heat" and then passes on to say that there are more urgent general problems regarding current war neuroses which concern psychiatrists. I would say that there are few more urgent problems which concern the profession of medicine than the prevention of neurosis.

I suggested that in the education of the young a better state of health might be attained by successful physical education working in close association with general education. Training which will improve function and create reserves of strength, and attention to the purpose of all movements and activities, contribute to the development of people who will stand up well to all sorts of strains that may be imposed on them. I agree that all this is commonplace but how often are these commonplace but vital matters neglected.

I repeat that to strive for accuracy in sensation and in action is a good aim and will develop a mechanism through which accurate thought may be created. What can be more accurate than the achievements of the great athletes mentioned by Dr. Neustatter, and many more like them who can hit a ball almost where they want! The greatest of them by the beauty and power of their movement are a joy and inspiration to watch. How they behave in the pavilion is merely evidence of their ability to do something else. Specialisation tends to exact a price.

When Dr. Neustatter replaces my phrase of successful physical education by physical-jerks psychotherapy and when he refers to the Victorian backboard he appears to be unaware of what educationists are trying to achieve by physical education. Dr. Neustatter admits he is untidy. I too am untidy but I am not proud of it and would never claim untidiness as a "concomitant" of the best sort of health.

Sutton, Surrey. A. L. KERR.

SIR,—A psychotherapist is accustomed, though not reconciled, to finding those who have been his patients penalised for that very reason; but we have a right to expect that medical boards examining recruits for the services should show a better understanding of psychological cases than they were able to do in 1914. An ex-patient of mine has just been classified C 3 and told that he is unlikely to be called up. He is a man of superb physique, and so far as I know had no physical defect except slightly varicose veins, which had been effectively treated by injection before his medical examination. At the time when he came under psychological treatment he held a good appointment which he filled more than satisfactorily, but he was acutely depressed on account of his inability to resist an obsessional urge to occasional abnormal conduct. He had been able to conceal this from his employers and associates and would certainly not have been rejected by the Army on account of it. He is now free from symptoms, cheerful, self-possessed, an excellent mixer, and has large reserves of energy and interest; but he admitted frankly when questioned by the board that he had received psychological treatment, whereupon they postponed their decision and asked for a report from me. I gave the opinion that his recovery might be expected to be permanent and that he was likely to make an exceptionally good soldier, and he was summoned for a further interview; he did not, however, see the board again but was told he had been classified as above mentioned, by a clerk who expressed amazement at this result.

There can be little doubt that had this man received no treatment he would have been accepted for the Army, though he would have been much less likely to make good than he is now; one can only suppose that the board, unable themselves to assess his mental condition, and having little faith in any benefit alleged to have been derived from psychological treatment, think it wise to reject all men who have ever received such treatment. I suggest that a psychiatrist or medical psychologist should be asked to assist a medical board when it has to deal with such cases.

Devonshire Place, W.1. J. NORMAN GLAISTER.

HORMONE TREATMENT OF UNDESCENDED TESTIS

SIR,—Your leading article of Sept. 14 is very interesting but I feel that it is somewhat biased. I wonder whether you are aware of all the evidence contained in the paper by myself and colleagues to which you refer. Your statement that our conclusions were "unsupported by, and indeed contrary to, laboratory experience . . ." ignores the experimental work reported in our paper. Our conclusion as to the possible damage to the testis in humans following treatment with gonadotrophin was strongly supported by our well-controlled experiments in laboratory animals. In our opinion the microphotographs we published clearly showed the marked degeneration which followed in the cryptorchid testes of the animals receiving hormone, as opposed to the very slight degenerative changes noted in the cryptorchid testes of non-treated animals. Thus far I have received no dissenting comments from the many urologists and experimental biologists who are interested in this problem in this country. Regardless of theoretical considerations, I feel sure that the repetition of our experimental work by any competent person would lead to conclusions similar to those we made.

Chicago. J. S. EISENSTAEDT.

PSORIASIS UNCONQUERED

SIR,—The annotation on p. 496 of your issue of Oct. 19 leads me to recall the following case. In 1932 a shepherd, whom I had been treating for psoriasis covering the extensor surface of both forearms for a considerable time with the usual internal and external remedies without benefit, called to tell me that he had cured himself by the application of whale oil and sulphur; he showed me his forearms and I saw no trace of the skin disease. There has been no return. I have had no opportunity to treat psoriasis since then. But, thinking the cure may have been due to vitamins in the whale oil, I now add cod-liver oil to any ointment prescribed for intractable ulcers, with most satisfactory results.

Galvelmore, Crieff. WILLIAM HAIG.

BREAD UPON THE WATERS

SIR,—Criticism of the bureaucracy is a barren sport. Whether medically qualified or not, the civil servants who now control us body and soul have so perfected the art of dividing responsibility that their consciences are beyond the threshold of ordinary stimuli. Yet the hardest masters pay their servants. The officers of the Emergency Medical Service in this hospital, and presumably in others, many of whom are attempting to live on a small fraction of their former incomes, received their September salaries only today. The only excuse which has been offered, without any expression of regret, is that the Ministry of Health has moved to a well-known pleasure resort. Are they now so engrossed with the local fun fair that they cannot attend to their duties, or is an attempt to be made to starve us into acceptance of any proposals which the government may see fit to make now that our contracts have expired?

A HALF-STARVED PHYSICIAN.

An Emergency Hospital, Oct. 28.

According to statistics just published only about 4800 persons died in 1939 from pulmonary tuberculosis in Sweden, a death-rate of 0·76 per 1000 of the population. In the five-year period 1911–15 the mortality was 1·94 per 1000 and in the period 1821–30 9·1 per 1000. The old idea that consumption was far more prevalent in cities than in the countryside held good until some ten years ago. About that time the mortality curves for this disease crossed one another, and since then the cities have had a lower figure than rural districts. This is due to a more rapid improvement in the towns, and not to any deterioration in the countryside. Today pulmonary tuberculosis is most prevalent in the northernmost part of Sweden, where the death-rate is 1·52 per 1000 compared with 0·76 for the whole country.

Dr. W. Norwood East has been appointed one of the Commissioners under the Prison Act 1877.

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SCOTLAND

SYNTHETIC HORMONE ANALOGUES

Prof. E. C. Dodds began his Cameron prize lecture in Edinburgh on the biological significance of the synthetic hormone analogues by surveying therapeutic methods of the past. From Galen's time until sixty years ago, he said, drugs had been derived from compounds occurring naturally in plants. After the rise of organic chemistry salicylic acid was synthesised; and later came the synthesis of acetylsalicylic acid, a compound not found in nature, and its introduction into the treatment of disease. Schafer and Oliver's discovery of a therapeutic agent in the adrenal glands and Murray's successful treatment of a case of myxœdema focused attention on the endocrine glands. Allen and Doisy's experiments with an alcoholic ovarian extract marked the commencement of the researches in which Professor Dodds had been particularly interested. For long the task of separating the active principle from the ovarian extract seemed insuperable. The discovery by Aschheim and Zondek that an œstrogenic substance was excreted in the urine during pregnancy led up to the isolation of pure œstrogenic substances by three separate workers, Marrian, Doisy, and Butenandt. The chemical structures of these substances varied and it was not clear whether the œstrogenic property was a specific action. Carcinogenic hydrocarbons were also found to be œstrogenic. The only common factor among these chemical substances was the phenanthrene nucleus, and it was thought that this was necessary to œstrogenic activity. Further experiments were carried out with unrelated compounds and one of these—*p*-hydroxy-propenyl benzene (anol)—was found to possess œstrogenic activity, which was, however, less than that of the œstrone isolated from pregnancy urine. Dimerides of anol were then investigated and it was during these experiments that three compounds were found which not only had œstrogenic activity but were at least three times as active as naturally occurring œstrone; these were stilbœstrol, hexœstrol, and a hexadiene. Although their physiological properties were similar to œstrone they were chemically unrelated to it. Clinically they were more useful as they were effective when given by mouth, more potent, and cheaper. They could be used in the treatment of symptoms arising in association with the menopause, failure of lactation, and certain forms of infantilism. The only untoward side-effect reported after their administration was nausea which was central in origin and appeared to be related to the nausea experienced in the early months of pregnancy; it occurred in only 1–2% of cases. The synthetic compounds which were most active pharmacologically—Prontosil, Salvarsan, and stilbœstrol—had a chemical relationship in the presence of two benzene rings linked in various ways. This linkage might be the fundamental factor in their pharmacological activity.

COMBINED RESEARCH IN NEUROLOGY AND PSYCHIATRY

At a recent meeting of the Edinburgh University court it was announced that the Rockefeller Foundation had made a grant to the university for the year 1940–1941 of £4500 for the furtherance of combined research in neurology, neurosurgery and psychiatry. This fund, together with other moneys which are available, will be directed by Mr. Norman Dott and Prof. D. K. Henderson who are collaborating to set up a combined neurological and psychiatric organisation. The neurology and neurosurgery unit under the direction of Mr. Dott has recently taken charge of a portion of Bangour E.M.S. hospital. The accommodation built in the Royal Infirmary a few years ago with the help of funds given by Sir Alexander Grant will now be used largely as a neurological diagnostic centre in close touch with Bangour where nearly all the operative work will be concentrated. A large team will include psychiatrists, neurologists, neurosurgeons, a worker in electroencephalography and the staffs of the usual ancillary services. Clinical material will be drawn from ordinary civil practice, air-raid casualties, and the wounded of the forces, so that the opportunities for coördinated research and therapeutic work should be excellent.

REGIONAL HOSPITAL PLANNING

Following Lord Nuffield's recent gift to provincial hospitals, representatives of voluntary hospitals from all parts of Scotland met in Glasgow to confer with members of the Nuffield Trust about the coördination of regional hospital schemes. Mr. S. P. Richardson, of the British Hospitals Association and the provincial hospitals regionalisation committee of the trust, said that the first aim was to promote the coördination of health services of all kinds, to eliminate all unnecessary services, and to see that services were adequate for the needs of the population throughout the district. The trust had no intention of interfering with the internal management of any hospital but they wished all voluntary and municipal hospitals in Scotland to be represented on the regional council so that their views might be pooled. The trustees were convinced that any step which would mean that not only voluntary hospitals but municipal hospitals were to come under one vast state organisation would be most detrimental to the public health services of the country. Alderman W. Hyde, secretary of the Nuffield Provincial Trust, said that the trustees had decided not to make donations or grants to individual hospitals. Scotland was already represented on the central medical council of the trust by Sir John Fraser and Professor Mackintosh, who had been invited to help to form a Scottish medical advisory committee; a nucleus of personnel had already been suggested. The trust proposed to place at the disposal of this committee such money as was necessary to finance the initial organisation. There would be direct contact between the Scottish and the English medical committees.

SCOTLAND'S FIRST WOMAN PROFESSOR

Dr. Margaret Fairlie was formally installed in the chair of midwifery and gynæcology in the University of St. Andrews at a graduation ceremony last week. Principal Sir James Irvine said that the use of the word "daughter" under circumstances where hitherto one had always been compelled to use "son" called attention to the fact that this was the first occasion when a woman had been admitted to a professorial chair in a Scottish university. To play the part of pioneer was no novel experience for the university which was the first in Scotland to open its doors to women students, but it was no desire for novelty that led to Dr. Fairlie's election. She had won the position by merit, by her sympathy and skill, and her zeal in imparting her knowledge to others.

UNITED STATES OF AMERICA

CIVIL SUIT AGAINST TYPHOID CARRIER

IN New York state people who are proved to be carriers of typhoid bacilli are registered and are thereupon placed under certain restrictions, so long as the carrier state persists. Last December one of these registered carriers was convicted of handling food in violation of the state law and was fined $25. A civil suit has now been brought against this carrier by an electrical engineer who asks $53,500 damages for the death of his wife from typhoid fever, contracted, it is alleged, through the illegal action of the carrier in preparing food.

SULPHATHIAZOLE

The present status of sulphathiazole in the treatment of infections was discussed at a recent meeting of the third district branch of the Medical Society of the state of New York by Dr. Charles H. Rammelkamp, assistant in medicine at the Boston University school of medicine. Sulphathiazole is more readily absorbed and more rapidly excreted than sulphapyridine. It diffuses readily into the pleural and ascitic fluids but irregularly into the spinal fluid, and therefore has not been used in cases of meningitis. In animals sulphathiazole is found to be only half as toxic as sulphapyridine and sulphamethylthiazole. In man it causes nausea and vomiting less often (a third to half as often as sulphapyridine) and when they occur the symptoms are less severe. Hæmaturia is less but drug rashes are more common. In the

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treatment of pneumonia sulphathiazole appears to be as effective as sulphapyridine, so far as present experience goes. Pneumococcus types which tend to be drug-fast to sulphapyridine unfortunately are equally resistant to sulphathiazole. Some success has been achieved in the treatment of *Staphylococcus aureus* septicæmia with sulphathiazole. In most of these cases adequate surgical drainage of all the focal lesions is necessary. Bacteriostatic and bactericidal tests in vitro show the superiority of sulphathiazole to both sulphanilamide and sulphapyridine in *Staph. aureus* infections. Sulphathiazole has also proved valuable in certain infections of the urinary tract, and is indeed the only sulphonamide which has been found effective in infections with *Streptococcus fæcalis*. Blood concentrations from 3 to 5 mg. per 100 c.cm. are found necessary for maximum bactericidal and bacteriostatic effectiveness in pneumococcus and in *Staph. aureus* infections. Lower concentrations are effective in infections of the urinary tract.

BLOOD TESTS DURING PREGNANCY

Since March, 1938, it has been legally required in New York state that a test of the blood of each pregnant woman for syphilis shall be made during pregnancy or at delivery. The object of this requirement is, of course, that cases of syphilis may receive treatment in time to preserve the health of the offspring. To what extent this object has been achieved is shown by the following table derived from a study of 84,475 birth certificates, on which have been recorded the facts relative to the taking of the test, though the result of the test may not be entered on the certificate. In 41% of the cases a test was made during the fifth month or earlier.

Stage of pregnancy	Tests made	% of total
Prior to delivery	64,413	76·3
Third month or earlier	17,892	21·2
Fourth month	8,297	9·8
Fifth month	8,436	10·0
Sixth and subsequent months	27,945	33·1
Month not stated	1,843	2·2
At delivery	17,041	20·2
Prior to pregnancy	232	0·3
Test not made	2,633	3·1
Question not answered	156	0·2
Total	84,475	

When the test is not taken at all a reason must be presented on the certificate. The most frequent explanations were that the mother had no prenatal care, that the birth was unattended, and that the physician who delivered her was not the woman's regular physician. There was also a group of patients who had refused to have the test made.

DEATH OF DR. F. P. LEWIS

On Sept. 10 Dr. Francis Park Lewis of Buffalo died at the age of 85 after a medical career lasting 63 years. He was a native of Hamilton, Ontario, a descendant of American loyalists who went to Canada at the outbreak of the American revolution. He graduated from Cincinnati in 1876 and immediately took postgraduate work at the New York Ophthalmic Hospital. He studied later in London, Berlin and Vienna, and has translated many medical works on the eye from German, French and Italian literature. Dr. Lewis is perhaps best known for his work in promoting the use of silver nitrate for the prevention of ophthalmia neonatorum. At the time of his death he was vice-president of the International Association for the Prevention of Blindness organised in Amsterdam in 1931.

At a meeting of the medical advisory council of the Nuffield Provincial Hospitals Trust on Oct. 5 Sir Farquhar Buzzard from the chair said that the trustees desired a general statement of policy in regard to the coördination and development of hospital and medical services. He pointed out that it would be difficult to draw up a statement of this kind without illustrative examples, and the meeting decided that subcommittees should be set up to consider pathological services, cancer services, and accident services.

LIGHTING IN FACTORIES

THE powers of the Home Secretary relating to factories, including the power to prescribe standards of lighting are now exercised by the Minister of Labour. In September, 1938, the Departmental Committee on lighting in factories submitted their fourth report containing recommendations on standards. Up to the outbreak of war regulations embodying those recommendations had not been made, and it was then felt that they should be modified to suit war conditions. The position was reviewed by the committee, and a fifth report containing amended recommendations was submitted in June, on the basis of which the Minister of Labour proposes to make regulations. These have been published in draft [1] and any objections to them must be sent to the minister within 40 days of Oct. 15.

In a large number of factories now the work has to be done at high pressure and a great strain is imposed on the worker; owing to the prevalence of night work and overtime the hours spent under artificial light are far longer than before, even in factories where there is adequate natural light. Some factories are permanently blacked out, with the result that artificial light is in use all the time. The present conditions of work in many factories are unnatural and new to most of the workers, and in order to maintain and increase production the committee recommended a higher standard of lighting than in their previous report.

The draft regulations are intended to apply in factories where persons are working for more than 48 working hours a week or in shifts. The suggested standards provide for both sufficient and suitable lighting. The general illumination over parts of the factory where persons are regularly employed are required to be not less than 6 foot-candles measured in the horizontal plane at 3 ft. above the floor, as against the minimum of 1 foot-candle at floor level, previously recommended. Where structural difficulties prevent the uniform attainment of the standard the general illumination at 3 ft. from the floor must be not less than 2 foot-candles, and where work is actually being done it must be 6 foot-candles or as near that as possible. Over other interior parts the illumination must be not less than half a foot-candle measured at floor level. All these are minimum values; the 6 foot-candle standard is based on illumination that will enable ordinary work to be done with ease, but higher standards will be needed for some classes of work.

Other provisions aim at the suppression of glare. Where any artificial light source is less than 16 ft. above the floor no part of the source or light fitting of a brightness greater than 10 candles per 1 sq. in. must be visible to persons normally employed within 100 feet of the source unless the angle of elevation from the eye exceeds 20°; local lights for particular areas of work must have suitable opaque shades or be otherwise screened to prevent glare; and as far as possible arrangements must be made, by screening or otherwise, to prevent discomfort or injury by the reflection of light from smooth or polished surfaces into the eyes of the worker, or eyestrain due to shadows.

The committee recommended that interior walls should be kept light in colour up to 20 ft. above floor level. No such provision appears in the draft regulations, but in a covering letter from the Factory and Welfare Department employers are reminded of the value of increasing the brightness of rooms in this way. The department, like the committee, urges that as much natural light should be used as possible. Natural light even in small quantities contributes to the cheerfulness of a room. The new regulations should raise the general level of factory lighting to that prevailing in our better factories.

1. Draft Statutory Rules and Orders on Factories. London: H.M. Stationery Office. 1*d*.

If "Waterloo 3311" is unobtainable at any time applications for ambulances for cases of illness should be made to Whitehall 2177 or Waterloo 6687. Applications in connexion with street accidents and emergencies should continue to be made by dialling 999.

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Obituary

HAROLD ALFRED SCHOLBERG

M.B. LOND., D.P.H.

Dr. Scholberg died at his home near Cardiff on Oct. 14 after a somewhat trying illness. As a consulting pathologist he was well known over a large part of South Wales for more than 30 years. Born in Chile of Scandinavian and Scottish parentage, he took his medical course at St. Bartholomew's Hospital where he was well liked. After graduating in 1898 he was house-physician to Lauder Brunton of whom he was an admirer. Later he became Sir Trevor Lawrence research student in pathology and he was a research scholar of the Grocers' Company. In 1903 he was appointed bacteriologist in the joint Cardiff and County laboratory, and lecturer in bacteriology at University College, Cardiff. Thus began his long association with what is now the Welsh National School of Medicine. In 1908 he became consultant pathologist to the Cardiff Royal Infirmary and a few years later he embarked on consultant practice in Cardiff. He made connexions with a large number of the hospitals in South Wales, among them the Whitchurch Mental Hospital where, with the congenial collaboration of Dr. E. Goodall, he did his best work chiefly on the pathology of mental disease. Although fortune led him into a busy consultant practice his heart remained true to research. He had a keen intellect and was deeply read in scientific subjects both within and outside of medicine, and he was in every way suited to the academic career which never quite became his lot. For the rest he gave himself unstintingly to the work of developing the school and although he shunned prominence he was an important influence in it.

Scholberg's championship of lost causes and his fights for the underdog sometimes put him at variance with his colleagues, and his intolerance of insincerity sometimes hurt more than he intended. To those who knew him intimately he was a kind-hearted, utterly unselfish and sympathetic man, with a boyish sense of humour. His laboratory staff were devoted to him. He leaves a widow and one married son.

Lieut.-Colonel Edwin Goodall writes: For twenty-one years, while I was medical superintendent of the Cardiff Mental Hospital and he part-time pathologist, we worked in close association. That research work, summarised annually in the hospital reports, was largely inspired and done by him. He steadily viewed the psychoses from the somatic standpoint, that of the physio-pathology of disease, and our work was undertaken in accordance with this standpoint which I shared. He grasped the need for the complete psychiatric clinic, a unit of the general hospital at university centres with medical schools, and we worked together to promote this conception, so elementary abroad, still unadopted here. Scholberg was a devoted student of medicine of the brilliant, unorthodox type, with a clear, quick, and critical mind. Under the ideal dispensation he would have been taken young, drafted into whole-time research, and left largely to his own devices. His eager, rapid mode of work, with running commentary and a sprinkling of Spanish expletives, what time an emotional cathartic seemed indicated, was caviar to the jaded. For him no trouble was too great which served to promote scientific medicine or was likely to help his colleagues.

DR. JITTA

Dr. N. M. Josephus Jitta, the honorary president of the permanent committee of the International Public Health Office, died on June 4. He had been the delegate for Holland on the committee from 1920 until early this year and in 1935 he succeeded Sir George Buchanan as president. His health had been failing for some time and when his term of office came to an end in October, 1938, he did not wish to stand again for the position of president, and Dr. M. T. Morgan was elected in his place.

Dr. Jitta had had a long and fruitful career as clinician and hygienist and as the administrative head of the health services of his country. He had held the post of president of the Council of Hygiene of the Netherlands since 1920 and had directed important researches on vaccination and postvaccinal encephalitis. He was the representative of the International Office of Public Health on the Health Organisation of the League of Nations for many years and he did much to coördinate the activities of the two bodies. He took a large part in the work preparatory to the revision of the International Sanitary Convention of 1926, especially in connexion with problems concerning the Suez Canal and the Mecca pilgrimage.

All who knew Dr. Jitta personally were struck by his kindly manner and by the sureness and subtlety of his judgment, and his long experience of international hygiene made his advice welcome to his colleagues.

INFECTIOUS DISEASE IN ENGLAND AND WALES

DURING THE WEEK ENDED SEPT. 21, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1538; whooping-cough, 1245; diphtheria, 1058; enteric fever, 68; measles (excluding rubella), 7435; pneumonia (primary or influenzal), 465; puerperal pyrexia, 123; cerebrospinal fever, 119; poliomyelitis, 38; polio-encephalitis, 2; encephalitis lethargica, 6; dysentery, 46; ophthalmia neonatorum, 68. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 20 was 1181, made up of: scarlet fever, 215; diphtheria, 185; measles, 408; whooping-cough, 30; enteritis, 30; chicken-pox, 36; erysipelas, 27; mumps, 4; poliomyelitis, 0; dysentery, 3; cerebrospinal fever, 16; puerperal sepsis, 21; enteric fevers, 35; german measles, 4; other diseases (non-infectious), 65; not yet diagnosed, 102.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 1 (0) from scarlet fever, 6 (0) from whooping-cough, 9 (2) from measles, 37 (1) from diphtheria, 45 (4) from diarrhœa and enteritis under 2 years, and 7 (1) from influenza. The figures in parentheses are those for London itself.

Plymouth reported 7 deaths from diphtheria, Manchester 3. Liverpool had 8 fatal cases of diarrhœa. There were 4 deaths from measles at Manchester. The fatal case of enteric fever was at Rochdale.

The number of stillbirths notified during the week was 227 (corresponding to a rate of 38 per thousand total births), including 25 in London.

Births, Marriages and Deaths

BIRTHS

BRAND.—On Oct. 27, at Eden Bridge, the wife of Surgeon Lieut.-Commander T. A. Brand, R.N.V.R.—a daughter.

MARRIAGES

EAST—THATCHER.—On Oct. 24, at Broadwater Church, Cecil John East, M.B., to Gwladys Elizabeth Griffyth Thatcher.

ODDIE—KESSLER.—On Oct. 21, at Ellesborough Church, Bucks, Ripley Oddie, B.M., Flying-Officer R.A.F.V.R., to Jeannette Anne Kessler.

DEATHS

FRANCIS.—On Oct. 13, at 32, Park Drive, Hastings, Alfred George Francis, O.B.E., M.B. Lond., F.R.C.S., F.S.A., in his 78th year.

FRIEND.—On Oct. 24, at Sidmouth, Devon, Herbert Edward Friend, M.R.C.S., formerly of London, aged 85.

HEWITT.—On Oct. 25, David Walker Hewitt, C.B., C.M.G., M.B. R.U.I., F.R.C.S., Surgeon Rear-Admiral, R.N. (retd.).

LEWIS.—On Oct. 23, Richard Crump Lewis, L.R.C.P.I., Lieut.-Colonel R.A.M.C. (retd.), of Grafton, Salcombe, S. Devon.

MAYO.—On Oct. 20, at Hove, Herbert Reginald Mayo, M.B. Camb., aged 66.

RAMSAY.—On Oct. 25, at Dutton, Longridge, near Preston, Jeffrey Ramsay, O.B.E., M.D. Lond., F.R.C.P.

SNELL.—In October, Ernest Hugh Snell, M.D., B.Sc. Lond., F.R.S.E., barrister-at-law, of Middle Temple, formerly medical officer of health for Coventry.

TURNBULL.—On Oct. 18, at Stert, Devizes, Robert Cyril Turnbull, M.D. Lond., late medical superintendent of Severalls Mental Hospital, Colchester, aged 63.

WYLER.—On Oct. 22, Edwin Joseph Wyler, M.C., M.D. Lond.

The National University of Ireland has awarded a travelling studentship in pathology to Dr. Francis Duff.

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Notes, Comments and Abstracts

GROWTH OF EVACUATED CHILDREN

BY J. E. CHEESMAN
ASSISTANT SCHOOL MEDICAL OFFICER, KENT COUNTY COUNCIL

IN a group of 500 children evacuated from London to a rural reception area in Kent, in September, 1939, the standing heights and weights, excluding boots and outdoor clothing, were taken immediately and arranged according to age-groups. It was found that these children were on the whole slightly superior in height and weight to the general London standard. The proportion showing poor nutrition and physique was low, comparing favourably with the native children. They came from better-class schools in a south-east suburb and were by no means slum children. Subsequent development during 3 and 6 months sojourn with us are shown in figs. 1 and 2.

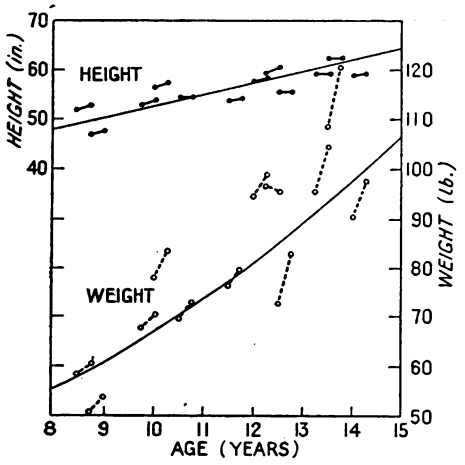

FIG. 1—Increase in height and weight in three months at different ages.

The continuous lines are derived from the average heights and weights of the children when they were first transferred to our district and are included as a rough standard. The children in nearly all age-groups gained in weight at a greater rate than would have been anticipated from the standard. This may be appreciated from the fact that the weight lines in the two graphs are not parallel to the standard but rise steeply away from it in most cases. This is evident throughout the different age-groups, as well as in groups of children who were, and remained, either below or above the standard for the whole series. It can be seen, too, that this accelerated increase in weight is not explained by an increase in height, which approximates much more closely to the standard than weight. The few exceptions do not discount the general upward trend. The data were collected at routine inspections, and the children were not specially selected.

The following general remarks are of interest, but causal relationships must not be taken for granted. The widespread impression among all who were watching these children is that their health and appearance have improved concurrently with their increase in weight. Weight above the average used to be associated, in R.A.F. personnel, with a sickness wastage below average.[1] There has been a falling off in the case-incidence of certain infectious diseases among children during the first four months of evacuation.[2] Weight rises more rapidly during the winter than the summer[3] but not to the extent shown by most of the children in this series. Weight tends to rise in school holidays and fall during school terms.[4] but with part-time education and the shift system in operation educational pressure has necessarily been relaxed. The graphs show at least that the children under survey increased in weight at an unusual rate while experiencing a change in home and school environment, and it can be assumed that the increase was due, not to season, growth in height or improvement in the standard of living but to other factors which are recognised in Scandinavia, where the wholesale evacuation of town children to the country and seaside during the summer months has long been a peaceful annual institution.

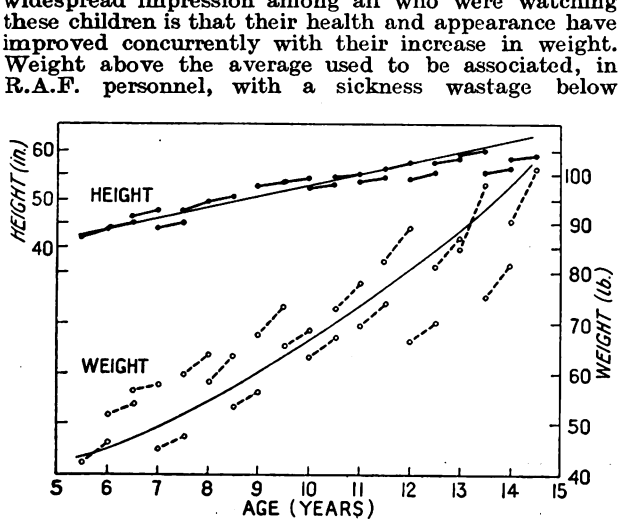

FIG. 2—Increase in height and weight in six months.

THE BLIND IN WAR-TIME

AT the outbreak of war the National Institute for the Blind undertook to continue its work whatever happened. Its work has not, of course, diminished and with the progress of war it is likely to increase. The council, under the chairmanship of Captain Sir Beachcroft Towse, with the joint blind welfare committee of the County Councils Association and the Association of Municipal Corporations, have gained the approval of the Minister of Health for a national scheme to include men, women and children blinded as a result of hostilities. The Ministry has arranged to meet the whole cost of hospital treatment in such cases; the institute, the local societies and the local authorities will undertake their vocational training. Residential centres for this purpose will have to be set up throughout the country, and with a view to staffing them the institute has opened a register of war workers, paid or voluntary, for the blind. Hundreds have already enrolled, and the institute will supply enrolment forms on request.

The institute undertakes the care of the blind person at any stage in his life. The Sunshine Homes are residential nursery schools where blind young children are given early training in the meanings of sounds heard and things touched. At the Court Grange special school dull and backward blind children receive the care and encouragement their disabilities require. A holiday home for children—"Pirates Spring," near Dymchurch—normally receives school journey parties of blind children in the holidays, but since the war it has been placed at the disposal of the L.C.C., and had been used, up to the end of the first seven months of war, to house the pupils and staff of Linden Lodge school for blind boys. Chorleywood College for girls with little or no sight and Worcester College for the Blind can both claim academic successes in the past year. Many of the pupils take the school-certificate examination, others go on to the higher certificate; there has been one entrant to Westfield, one winner of the Barker scholarship at Queen's College, Oxford, and many entrants to the institute's school of massage. One of the old boys is a fellow of Balliol.

The Braille library of the institute is composed of 15,000 volumes and grows yearly as 150 voluntary Braille writers add to the list. If a blind student requires any book not in the library it is forthwith transcribed for him. At the beginning of the war the department responsible for the library took over, for the Government, the task of censoring all Braille letters, books and periodicals sent to foreign countries. During the year a new series of "Panda" books have been published in Braille. They are concise topical books, or fiction, and correspond to the familiar Penguins. They are bound on a Spirax wire coil, which makes it possible for the reader to open them out flat, and saves paper by allowing more Braille characters to the page. Paper saving has been taken seriously by the blind, and the twenty separate newspapers and magazines published before the war have been reduced to sixteen. The institute, however, puts in a plea for a special allowance of paper which means even more to the blind reader and writer than to the rest of us.

1. Treadgold, H. A. *Lancet*, 1934, 1, 1377.
2. Glover, J. A. *Proc. R. Soc. Med.* 1940.
3. Holt, E. The Scales, New York, 1924.
4. Allen, J. *Lancet*, 1937, 1, 674.

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The blind masseurs and masseuses were among the first to volunteer for national service at the outbreak of war, and many of them enlisted in the Chartered Society's massage corps. During the year 16 graduates of the institute's massage school obtained hospital and clinical appointments, and five started in private practice. Many blind people every year are trained in secretarial work, piano tuning, basket work and handicrafts; blind musicians make use of Braille music; old people read the Moon embossed type, some are journalists, lecturers and teachers; some manage trading kiosks, which can be learned easily at any age, or listen to the "talking book," the special gramophone which reads aloud to them. The scope of the institute's work is limited only by the ingenuity of its council and the funds they are able to control. Contributions should be sent to the treasurer, National Institute for the Blind, 224, Great Portland Street, London, W.1.

MIDDLESEX PRESCRIPTIONS

IN August of this year there was a slight decrease in the number of prescriptions dispensed in Middlesex as compared with the number dispensed in August, 1939, the last month of peace. Figures considered at a meeting of the war emergency section of the Middlesex pharmaceutical committee on Oct. 23 showed that 221,896 prescriptions were dispensed in August, 1939, as against 221,749 in August, 1940; the insured persons had increased, however, from 862,289 to 868,816. In August last year 257 prescriptions were dispensed per 1000 insured persons, the corresponding figure in 1940 being 255 per 1000. It seems that as far as Middlesex is concerned there has been little change in the amount of medicine consumed per insured person since the outbreak of war. There has, however, been a sharp rise in the average cost of medicines per head. In August, 1939, the average cost per 1000 insured persons was £9 14*s.* 2*d.*, while the comparable figure for August, 1940, is £11 0*s.* 3*d.* There has been no change in the dispensing fees paid to chemists, the increased cost being entirely due to the rise in prices of ingredients. If the cost of ingredients continues to rise, the additional value of stock which a chemist will have to carry will be much greater and the additional capital involved will be appreciable; it may become necessary to ask for a reconsideration of terms to meet the changed situation.

NEW PREPARATIONS

BOOTS PURE DRUG CO. (Nottingham) announce that for local application in wound infections Sulphanilamide Powder (Boots) is supplied in cartons containing 10 packets of 15 g.

"WELLCOME" BRAND DELAY INSULIN, an insulin preparation with a prolonged blood-sugar lowering action, has been made available by Burroughs Wellcome & Co., London, in a strength of 40 international units per c.cm. An additional strength of 80 units per c.cm. will be available soon. The product is issued in boxes of five 5 c.cm. phials containing a solution of protamine insulin, with a phial of sodium phosphate buffer solution, which, when mixed with the protamine insulin solution, produces a freshly precipitated suspension ready for subcutaneous injection. The suspension is only stable for a limited period but the unmixed solutions will remain of full-unit value for eighteen months.

CORRIGENDUM.—In the article by J. F. Heggie and R. M. Heggie (*Lancet*, Sept. 28, 1940, p. 391) describing an antiseptic analgesic tannic-acid jelly for burns the formula for the glycerin-tragacanth base should read:

Pulv. tragacanth	2·0%
Glycerin	10·0%
Distilled water	ad. 100

On Wednesday, Nov. 6, at 2.30 P.M., the sections of therapeutics and surgery of the ROYAL SOCIETY OF MEDICINE are holding a discussion at 1, Wimpole Street, London, W.1, on the treatment of burns. The openers will be Surgeon Rear-Admiral C. P. G. Wakeley, Wing-Commander Cecil Flemming, Mr. A. H. McIndoe, Prof. W. C. Wilson and Prof. L. J. Witts.

On Friday, Nov. 8, at 2.30 P.M. Dr. A. J. Ballantyne will deliver his presidential address to the section of ophthalmology. He will speak on the reflexes of the fundus oculi.

Medical News

University of Oxford

An examination for the Theodore Williams scholarship in pathology will be held in the Sir William Dunn School of Pathology on Nov. 10, at 2 P.M. The scholarship is open to any member of the university, whether man or woman, who on June 30 in the year of the award shall not have exceeded 26 years of age and shall have attended the course in general pathology and bacteriology in the Sir William Dunn School of Pathology either in the year of award or in the previous year. Those intending to present themselves for the examination should inform the professor of pathology before Nov. 6.

University of Cambridge

On Oct. 18 the following degrees were conferred by proxy:

M.D.—R. W. D. Turner.

M.B., B.Chir.—J. D. Kidd and B. L. F. Heydon.

Scottish Conjoint Board

At recent examinations of the board of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, the following were successful:—

L.R.C.P. & S.E., L.R.F.P.S.G.

Hiram Baddeley, M. C. Bell, Harold Bernstein, T. B. Binns, D. S. Bomson, Thomas Brittain, A. G. Buick, D. E. T. Donaldson, M. D. Evelyn, Leo Feld, A. J. Friedman, A. P. Govender, Abraham Greenberg, J. J. Greenwald, Emanuel Grossman, N. S. Hantman, M. E. Haut, I. F. K. Hughton, Benjamin Hurewitz, Joseph Israel, P. G. M. G. Jones, Sidney Katz, M. J. Kelly, H. H. Kirk, A. M. Kumaraswamy, Jerome Kupchan, Bertram Levy, D. J. Livingstone, Leslie London, Archibald McAllister, E. W. Magill, Elizabeth D. Mercer, R. C. Nirsimloo, George Novis, Agnes W. B. F. O'Gorman, Sidney Osroff, Frank Pomerantz, M. I. I. Rajah, C. E. K. Ratnam, J. A. Reid, Isidore Robins, Bernard Ross, W. L. Schiffman, Julius Siegel, M. N. Sholtzow, Philip Snell, A. I. Swiller, Helen E. Swiller, M. P. Taff, M. E. Vawda, W. A. White, Paul Wiesenfeld, and D. L. Ziselman.

The following graduates of recognised foreign universities have also been admitted licentiates:—

W. B. Ehrmann, Elemer Forrai, Eric Goldsmith, Anselm Horowitz, Richard Posner, I. E. Reichenfeld, and Marianne H. Weigert.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council of the college on Oct. 26, with Prof. W. Fletcher Shaw, the president, in the chair, the following were admitted in absentia to the membership:—

A. F. Anderson, Edinburgh; J. O. E. Apthorp, Cape Town; A. L. Deacon, London; W. T. Dingle, Canada; D. B. Fraser, London; G. S. Lester, Walsall; S. W. Liggett, London; Robin Murdoch, R.A.M.C.; F. J. P. O'Gorman, Sheffield; Coralie W. Rendle-Short, Bristol; I. E. J. Thomas, Tunbridge Wells; L. O. Watt, Canada, and Stanley Way, Newcastle.

Army Casualties

The following R.A.M.C. casualties are announced:—

Prisoner of War.—Lieutenant J. H. Bolton, M.D. Melb.; Major J. H. T. Challis, M.R.C.S.; Captain A. Crook; W.S./Captain E. R. Dansie, M.B. Lond.; Lieutenant A. R. Dearlove, M.B. Lond.; A/Major A. K. Gibson, M.B. Edin.; Lieutenant J. J. Kennedy; Major L. W. Lauste, F.R.C.S.; Lieutenant A. W. C. Mellor, M.D. Camb.; Lieutenant H. T. Tate, M.B. St. And. and Major W. E. Tucker, F.R.C.S.

Previously reported wounded and missing, now reported prisoner.—Major J. G. Lawson, M.B. Durh.

Previously reported missing, now reported prisoner of war.—Major G. W. Barber, M.R.C.S.; Captain P. T. Cooper, M.B. Camb.; Lieutenant P. A. Forsyth, M.R.C.S.; Lieutenant T. C. N. Gibbens, M.B. Camb.; Lieutenant I. Jacobson, M.B. Cape Town, and Lieutenant I. Schrire, M.B. Cape Town.

Appointments

CAIRNS, J. G., M.B. Glasg., D.P.H.: tuberculosis officer and senior asst. M.O. for Portsmouth.

CAMPBELL, R. M., M.R.C.S.: asst. M.O. (Maternity and Child Welfare) for Halifax.

GALLAGHER, E. J., M.B. Melb., F.R.C.S.I.: resident registrar to the fracture and orthopædic department of the Coventry and Warwickshire Hospital.

GHOSH, S. C., M.B. Lucknow: M.O. at the Cornwall Works Dispensary, Smethwick.

MILLER, MARY, M.B. Dubl., D.P.H.: asst. M.O. for Leigh, Lancs.

WILLIAMS, A. F., M.B. Manc.: R.S.O. at Manchester Northern Hospital.

WINTER, HARRY, M.D., L.M.S. Nfld. M.Bd.: R.S.O. at the Coventry and Warwickshire Hospital.

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ORIGINAL ARTICLES

VIRUS DISEASES ACQUIRED FROM ANIMALS*

BY S. P. BEDSON, M.D., M.Sc. Durh., F.R.S.
PROFESSOR OF BACTERIOLOGY IN THE UNIVERSITY OF LONDON AT THE LONDON HOSPITAL

THE list of virus infections of animals to which man is susceptible is a large one. It includes rabies, equine encephalomyelitis, lymphocytic choriomeningitis, Rift Valley fever, cowpox, foot and mouth disease, louping ill, psittacosis and possibly the rural form of yellow fever. If one includes the rickettsias in the virus group, and I am not convinced that we should make a distinction between them, there are the various forms of endemic typhus—Rocky Mountain spotted fever, murine typhus, fièvre boutonneuse of the Mediterranean littoral, Australian Q fever, tsutsugamushi fever and scrub typhus of Malaya, the last two of which, according to Lewthwaite and Savoor (1940), appear to be the same. Certain of these diseases are relatively unimportant to human pathology. For instance, indubitable human cases of louping ill and Rift Valley fever have been limited to laboratory accidents, and foot and mouth disease is excessively rare in man. I shall here confine myself to the three commonest examples, rabies, equine encephalomyelitis and psittacosis. These exemplify three modes of spread: direct contact, inhalation of infective particles, and transmission by insects.

RABIES

Rabies has disappeared from this country, but it still occurs in other parts of the world including the British Empire; in 1935 some 118,000 people received prophylactic inoculation. Our knowledge of the virus dates from the time of Pasteur, but we know less about it than many others. It is one of the so-called neurotrophic viruses and the diagnostic importance of the cytoplasmic inclusion—the Negri bodies—to which it gives rise in nerve-cells, particularly those of the hippocampus major, is fully recognised. The filtrability of the virus has been established and the diameter of 100–500 mμ ascribed to it by recent ultrafiltration experiments (Galloway and Elford 1936) should bring it within the limits of visibility with the microscope. Yet it has not been seen with certainty and opinions differ as to whether or not it passes through a developmental cycle during multiplication and as to the exact nature of the Negri body. There is however no doubt about the mode of transmission of rabies. The virus is present in the saliva of the rabid animal and is transmitted by its bite or less commonly by the soiling of scratches of superficial wounds with the infective saliva. About 90% of human rabies is due to dog bites, but other animal species such as the cat, wolf, jackal, domesticated herbivores and ungulates and various small rodents have been a source of human infection. Lately this list has been extended by the addition of the vampire bat, which in Trinidad and South America has been found to suffer from rabies, and certain species of South African mammals, such as the merkat, in which rabies is endemic. So wide is the host range of this virus that in a country in which rabies is endemic the bite of any animal must be considered suspect.

By the systematic destruction of rabid dogs and all animals bitten by them and the imposition of quarantine on all dogs coming into the country the disease has been eradicated from these islands. This success, which has been made possible by our geographical position, may, as Sir Henry Dale has pointed out, have a bearing on the nature of rabies virus. If viruses were non-living agents which had their origin in some peculiar derangement of cell metabolism one would not have expected the measures to have been effective. After the destruction of all rabid animals and the prevention of the reintroduction of the disease why did not rabies reappear? The answer seems to be that the virus of rabies is an organised living agent.

In countries less favourably situated than our own, rabies continues endemic, and is kept in control by the slaughter of rabid animals and those animals bitten by them, and by the muzzling of dogs. Recently an attempt has been made actively to immunise dogs against rabies and although this procedure has given encouraging results in Japan and Hungary it is as yet early to say how effective it will prove in the control of rabies. In the meantime where rabies remains endemic one has to fall back on the second line of defence—the prophylactic immunisation of man. The long incubation period of rabies—20 days to 12 months with an average of 40 days—suggested the possibility of protecting infected persons by active immunisation. In addition to the original vaccine of Pasteur, in which the virus in the spinal cord of infected rabbits is attenuated by varying periods of drying, we now employ vaccines in which other agents, such as phenol, formol, ether, glycerol or heat, are used to inactivate the virus. Of these vaccines the carbolised is the most in vogue whilst vaccines made from dried cord, or cord inactivated by heat or ether or prepared by simple dilution, are the next most popular; the other types are but little used.

Proof is lacking of the efficacy of antirabies vaccination, for ever since its introduction it has been applied wherever possible to anyone bitten by an animal suspected to be infected with rabies. In a disease so terrible it would be difficult to withhold treatment to provide controls. But there is presumptive evidence in support of the procedure. The chance of rabies developing depends on a variety of factors such as the severity of the bite, its situation, whether the bite was inflicted through clothing and so on. Babès has stated that the mortality in people bitten by rabid dogs and receiving no specific treatment may range from 3% for bites inflicted through clothing to 80% for severe bites of the face. The figures published by the League of Nations for 1929–35 show that only 0·4% of 524,258 people receiving antirabies treatment died from rabies, but many of these had probably not been bitten by rabid animals since specific treatment is resorted to wherever the least doubt exists as to the healthiness of the animal. Nevertheless one has the impression that the mortality from rabies in these people would have been greater had they received no specific treatment, but it is an impression and no more.

EQUINE ENCEPHALOMYELITIS

With the possible exception of Venezuela equine encephalomyelitis is confined to North America, where it is endemic in certain states of the eastern seaboard and in a more extensive area in the western part of the United States. Although this disease has been recognised clinically for some time it was only nine years ago that Meyer and his colleagues (1931) in San Francisco showed it to be due to a filtrable virus. Two years later Ten Broeck and Merrill (1933) confirmed this and demonstrated that although the cases in the eastern states were clinically similar to those in the west the virus causing them was serologically distinct. The division of the virus of equine encephalomyelitis into eastern and western types is now well established; possibly the Venezeulan strain studied by Beck and Wyckoff (1938) may provide yet another, for cross-immunity experiments showed that it was antigenically unlike both North American types.

This plurality of serological types, with which we are familiar in certain bacterial species such as the pneumococcus, is by no means uncommon among viruses. The virus of foot-and-mouth disease occurs in at least three distinct serological types and epidemic influenza presents an even greater variety. The eastern and western types of equine encephalomyelitis virus, though serologically distinct, are otherwise similar. They measure some 10–20 μ in diameter and their clinical manifestations are essentially the same.

In the western states equine encephalomyelitis is confined to the river valleys, whereas in the eastern it is

* An abridged version of the Chadwick lecture Human Virus Infections of Animal Origin: their mode of spread and control delivered at the London School of Hygiene and Tropical Medicine on May 21, 1940.

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found in the marshy country along the Atlantic seaboard. In both areas it has a clear seasonal incidence; it appears in the late summer and early autumn and ceases abruptly with the onset of the cold weather. Both the seasonal incidence and the geographical distribution—river valleys and marshlands—suggested that the disease was spread by mosquitoes, and in 1933 Kelser demonstrated experimentally that the virus could be transmitted from guineapig to guineapig and from this animal to the horse by the mosquito *Ædes ægypti*. It is now known that under experimental conditions quite a number of species of ædine mosquitoes are capable of transmitting the disease. (Ten Broeck 1935; Madsen, Knowlton and Rowe 1936; Kelser 1938.) As Merrill and Ten Broeck have shown (1934) the virus multiplies in the insect and some 4–5 days must elapse after feeding before it becomes capable of transmitting infection; thereafter it remains infective for life. Although it has thus been clearly established that under experimental conditions this disease can be transmitted by mosquitoes, infection in mosquitoes trapped in areas where equine encephalomyelitis was epidemic has never been demonstrated. Nevertheless there can be no real doubt that it is by the agency of these insects that the disease is spread in nature.

It may well be asked how a disease of the central nervous system comes to be transmitted by a blood-sucking insect. The answer is that infection passes through two phases, as the investigations of Ten Broeck and his colleagues and of Meyer and his co-workers have clearly shown; an observation confirmed by Hurst (1936) in this country. After infection the virus generalises and multiplies in the viscera; it is present in the blood-stream in considerable quantity. This stage of the infection is associated with pyrexia but no other symptoms; it lasts two to three days. The second phase of the disease begins with the disappearance of virus from the blood-stream and the onset of nervous symptoms, the virus reaching the brain and cord by being excreted on to the nasopharyngeal mucosa and passing centripetally via cranial nerves. It follows that the horse is only capable of transmitting the disease by the agency of mosquitoes during a restricted time and before the appearance of clinical symptoms indicates that the animal is infected. So brief, in fact, is the period in which the horse is infective for the mosquito that Ten Broeck and his colleagues as early as 1933 suggested that the horse was not the primary host of this virus. This suggestion has received a good deal of support from recent observations.

In the late summer and early autumn of 1938 there were severe outbreaks of equine encephalomyelitis in America, more particularly in the eastern states in which it is endemic; it was during this outbreak that the occurrence of human cases was first established beyond doubt. At the time when the equine disease was at its height a considerable mortality amongst pigeons on some of the affected farms was noticed. Investigations of these birds by Fothergill and Dingle (1938) showed that their deaths were due to the equine virus. What is even more interesting was the demonstration by Tyzzer, Sellards and Bennett (1938) that pheasants dying on a range in Connecticut were also infected with this virus. These authors have suggested that certain species of birds are the natural reservoir of this virus and that only when the epidemicity of this disease rises above a certain level does infection of the horse and of man take place.

Whether this is so or not the fact remains that it was in the very severe outbreak in 1938 that human cases of the disease were first indubitably recognised. These were not numerous but two points served to bring them into prominence; the high incidence amongst infants and young children and the very high mortality amongst the young age-group. These latter cases were invariably fatal after running a fulminating course of about two days. Clinically obvious infection in adults was much rarer, ran a much longer course and often ended in recovery. How widespread infection may be in man is not known—probably much wider than clinical manifestations would lead one to believe. A serological survey of humans in the affected area at the time of an equine outbreak would probably throw light on this point.

Until we know more about the epidemiology of this disease it is not clear what steps should be taken to prevent human infection. Presumably this results from the bite of infected mosquitoes; this at any rate appears to be true of the cases in infants and very young children who had no possible contact with infected horses or other primary hosts. Is the reservoir of human infections the horse, or do both the equine and human cases arise from avian sources as Tyzzer and his colleagues suggest? If the former is true then by active immunisation of the horses in endemic areas—and promising results have already been obtained in this direction—one should be able to diminish the chance of man becoming infected. In any case the protection of man against the bites of mosquitoes at times of epidemics—and this applies particularly to the infants and young children in whom this disease runs such a virulent course—should reduce its incidence.

PSITTACOSIS

As late as 1930 doubt existed as to whether the human disease which had been labelled psittacosis did in fact originate in parrots, and some went so far as to suggest that the parrots were infected by man. The pandemic of 1930, however, gave ample opportunity for clearing away existing misconceptions and it was not long before investigators, working independently in this and other countries, showed that the causal agent of both the human and avian disease was a filtrable virus.

This virus is one of the largest and is readily visible under the microscope. It stains more easily than many viruses and shows considerable morphological variation, some of its forms bearing a close resemblance to bacteria. Both in staining properties and morphology it resembles many species of rickettsia, and some authorities, such as Lillie in America, think it belongs to the rickettsial group. It seems to me preferable to retain this agent in the virus group, where with the viruses of trachoma, inclusion conjunctivitis and lymphogranuloma inguinale it forms what I have termed the "right wing" of the virus group. If in the future it proves justifiable to separate viruses from rickettsias the right wing group would bridge the gap between them.

It was known in 1930 that other avian species as well as parrots and parrakeets were susceptible to this virus, in fact human cases indubitably due to infection from canaries were encountered during the pandemic, and the virus of psittacosis was isolated from various species of finch coming from mixed aviaries in which the disease was prevalent. But it was thought that only psittacine species suffered from this disease in nature; they alone, it was believed, constituted the primary hosts of this virus. Recent work has shown this to be incorrect. During the last few years cases of an atypical pneumonia have been described in the Faroe Islands. These have been confined to middle-aged women and have occurred in the late summer and early autumn. Struck by the seasonal and age distribution of this disease and the absence of positive bacteriological findings in these cases Rasmussen (1938) investigated the matter more closely. Clinically the cases resembled psittacosis. In the late summer the islanders catch the newly fledged fulmar petrels which they salt down for winter consumption; these birds are an important source of food in the Faroes. The young birds leave their nests and collect on the rocks near the sea where the men net them. The women pluck and strip the birds and put them in salt. These facts suggested to the Danish investigators that the human infections came from the fulmars and that the agent was either psittacosis or a closely allied virus. In 1938 Dr. Madsen of the State Serum Institute in Copenhagen asked me to examine the serum from cases of this disease for psittacosis antibody and he arranged for bird and human material to be examined for the virus by Dr. Haagen in Berlin. Both investigations proved positive. The serum from five out of seven patients fixed complement in the presence of a psittacosis antigen; the two negative sera were from clinically doubtful cases. Haagen and Mauer (1939) isolated a virus indistinguishable from psittacosis virus both from young fulmar petrels and from material coming from the human cases. The final identification of this virus with psittacosis virus has not yet been made, but in all probability they are the same.

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More recently Professor Dungal of Reykjavik sent me the serum from five cases of a similar disease which had occurred in Iceland where fulmar petrels are used as food; all five gave a positive psittacosis complement-fixation test. The occurrence of infection with this virus in a species of bird so unrelated to the parrot family and so entirely different in habits and distribution is of particular interest. One wonders whether other species of seabird may not suffer from psittacosis and whether cases of infection may not arise in some of our islands off the Scottish coast where seabirds form one of the sources of food-supply.

It is my belief that the majority of human infections are contracted by the inhalation of infective particles. Others hold that infection is more commonly picked up by handling infected birds or in cleaning their cages, the virus being introduced by the mouth. It is true that the closer the association between man and infected bird the greater is the chance of infection, and I have known of several human cases of psittacosis resulting from the practice of bill-to-mouth feeding. But there are several points which make me doubt the importance of the alimentary tract as a route of infection. One is the great readiness with which man contracts psittacosis when exposed to infected birds, which is not what one would expect were the alimentary tract the portal of entry. The infected bird suffers from diarrhœa and its feathers get soiled with droppings which contain the virus in large quantity. The droppings dry and get dusted off as minute particles which are readily dispersed in the air. There are many examples of man becoming infected merely through having gone into the room in which the infected birds were kept or even where they had been housed. In an outbreak in the laboratories of the U.S. Public Health Service at Washington one of the victims was a porter who had to wheel a trolley along the corridor past the door of the laboratory in which psittacosis investigations were being conducted. What is more, the main incidence of the infection in human cases falls on the respiratory tract; in cases of any severity pneumonic consolidation, lobular in distribution, is always present, and inflammation of the mucosa of the upper respiratory tract is a constant feature of those cases which come to autopsy. In view of these facts it appears to me that in bird-to-man infections the virus is passed through the air in the form of infective particles —dried droppings—which gain their entrance by the respiratory tract.

How is man to be protected against infection with this virus? Some might say that the answer to this question was quite a simple one; avoid contact with birds liable to harbour the disease. And although in theory this is reasonable, in practice it is difficult to enforce. The keeping of cage birds as pets—and parrots and parrakeets are particularly popular—is widespread; any interference with this practice would be strongly opposed. Where, as in the Faroe Islands and Iceland, infection is contracted from fulmar petrels which are caught for food the practice has been forbidden. But any such legislation applied to the keeping of cage birds would be impossible to enforce, so one has to fall back on less drastic and less effective measures.

The outbreaks of psittacosis in Britain and on the Continent during 1929–30 had their origin in imported birds; the primary focus of infection was in South America. It was thought, therefore, that an embargo on the importation of birds of the parrot family into this country would reduce the chance of human infection, and in 1930 a law was passed prohibiting the entry of parrots and parrakeets except under licence. All birds of these species so admitted are inspected on arrival at the port of entry and only allowed to come in if healthy in appearance. Nevertheless cases of human psittacosis have continued to occur though they have probably been less numerous than they would have been without the embargo.

The reason for this relative failure is two-fold. First, it is not possible to say from the appearance of a bird whether or not it is infected. As in any other infectious diseases some psittacosis infections are inapparent and birds may continue to carry the virus, in some instances for long periods, after they have recovered from an attack of the disease. Both types of carrier, although healthy in appearance, are a source of infection for other birds and for man, and in the last ten years many human cases of psittacosis have had their origin in avian carriers.

The second reason for the failure of the embargo is the fact that the home stocks are infected. Parrakeets, budgerigars in particular, are bred extensively in this country, and we now know that infection is present in these birds. The budgerigar, though susceptible to the virus of psittacosis, is less so than many other psittacines and when infected is more likely to develop a subclinical attack; the carrier state is readily set up in them. Whether these home-bred birds have always been infected or whether they acquired infection in the pandemic of 1930 is not known. The fact remains that they are infected and that in consequence the embargo is rendered in part ineffective.

This is not to condemn the embargo or to suggest that it should be lifted, but if one possessed some more accurate means of detecting the presence of infection than mere inspection the control of psittacosis in birds could be made more effective. In this respect the adaptation of the complement-fixation test to the diagnosis of psittacosis in birds by Meyer and Eddie (1939) in California will probably prove valuable. According to these investigations a negative test indicates freedom from infection and it should be possible by this means to decide which birds should be admitted and which destroyed. In the same way if birds in any of the home stocks come under suspicion they could be investigated and those infected destroyed. And in the rapid diagnosis of the human cases, particularly those which are mild and atypical—and there are many which are—the complement-fixation test can render invaluable aid. By these means it should be possible to bring this disease more effectively under control and materially to reduce if not to eradicate psittacosis in man.

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EXOPHTHALMIC OPHTHALMOPLEGIA

BY H. G. MCGREGOR, M.D. Lond., M.R.C.P.
ASSISTANT PHYSICIAN TO THE ROYAL SUSSEX COUNTY HOSPITAL

ALTHOUGH well over 100 cases have been reported in the last eighty years, exophthalmic ophthalmoplegia has only recently been separated from various cerebral-nerve palsies associated with thyrotoxicosis. The report of a further case not only helps to draw attention to a condition not yet widely appreciated but also adds to the by no means abundant material from which the natural history of the disease has been deduced.

CASE-RECORD

A man, aged 37, gave a three-month history of double vision on looking upwards. To counteract his diplopia he had to throw his head backwards and carry it in that position all day. He felt perfectly well and had no headache or other complaint. He had previously always been healthy, except for occasional bouts of indigestion. Three sisters and a brother had "goitre." One of the sisters had died from Graves's disease; one still had Graves's disease, for which thyroidectomy had been performed; the other two had "large goitres with no symptoms."

The patient had difficulty in moving the right eye upwards and outwards, and there was a ptosis of the right lid. Exophthalmos of the right eye was somewhat masked by the ptosis

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(figs. 1 and 2). Fundi, media, and fields of vision were normal. No abnormality of the central nervous system was discovered; there was no enlargement of the thyroid gland or other sign of thyrotoxicosis; the heart was normal in size, position, rate, and rhythm; blood-pressure 150/90. The blood-picture was normal. Radiography of the skull and right optic foramen revealed no abnormality. Electrocardiogram normal; Wassermann reaction negative.

Four weeks later the right eye remained unaltered (fig. 3), but signs of severe thyrotoxicosis had developed. He had diarrhœa and presented a picture of extreme nervous tension. He had lost over a stone in weight, and was apt to be lachrymose. The skin was warm and moist; there were tachycardia and tremor of the hands. No enlargement of the thyroid gland could be detected.

During observation in hospital for ten days he continued to waste rapidly. The basal metabolic rate was plus 36%.

a paralysis not of individual ocular muscles but of movements of the eye in a particular plane; it is not due to a lesion of the nervous paths but is merely a mechanical effect of the exophthalmos.

Ætiology.—Observations during operations, pathological studies, and the results of experiments on animals have shown that the ophthalmoplegia is caused by a rise of pressure within the cone formed by the globe and the external ocular muscles and fascia. At first the rise of pressure interferes with movement mechanically; next œdema and cellular infiltration develop in the orbital tissues, leading to an increase in volume of the orbital contents followed by degeneration of muscles. Thus, clinically it has been found that the ophthalmoplegia is closely linked with, and in general proportion to, the exophthalmos: when exophthalmos is unilateral, so is the ophthalmoplegia; the ophthalmo-

FIGS. 1 and 2—Ophthalmoplegia and slight exophthalmos of right eye of three months' duration.
FIG. 3—A month later. Signs of thyrotoxicosis had developed, but the eye was unaltered.
FIG. 4—A month after thyroidectomy.
FIG. 5—Nine months later.

Subtotal thyroidectomy was performed, from which he made a good recovery. Sections of the gland removed at operation showed a lymphoplastic parenchyma, with diminution of interlobular collagen. Some of the acini contained colloid, but on the whole they were small, sinuous, and lined with cubical epithelium.

Six weeks later the patient had lost all signs of thyrotoxicosis. His weight had increased by a stone; his pulse-rate had fallen to normal; he had lost his tremor and felt well. The exophthalmos of the right eye had increased considerably, however (fig. 4). There was œdema of the lower part of the conjunctival sac; the eye was almost immobile, and there was some superficial ulceration of the cornea, which responded to local treatment. Deep X-ray irradiation of the pituitary fossa was carried out, but nine months later the eye and the general condition remained unchanged.

COMMENTS

The chief interest of this case is the relatively long duration of the ophthalmoplegia before the onset of severe exophthalmos. It seems to be established that in this condition the deranged mobility of the eye is a direct consequence of the exophthalmos. In this case, however, ophthalmoplegia was present when the exophthalmos was slight and developing slowly. The second point of interest was the necessity of having to perform subtotal thyroidectomy because of the patient's general condition, thereby running the risk of increasing the symptom for which the patient sought relief—an event which actually took place. To appreciate the significance of these two points it is necessary to have some knowledge of the nature of the disease.

The recognition of exophthalmic ophthalmoplegia as a separate entity is due in large part to Brain (1936).

Nature and course.—The onset in the spontaneous cases is usually subacute, and often one eye only, most commonly the right, is affected. It is rare for the patient to have general symptoms of thyrotoxicosis before the ocular symptoms arise; occasionally, however, the disease appears as a complication of established Graves's disease. Often exophthalmic ophthalmoplegia supervenes in persons who have had a total or a subtotal thyroidectomy, when the basal metabolic rate may be below normal and the patient in the hypothyroid state. It is plegia is more severe in the more protruding eye. That ophthalmoplegia is not the rule in exophthalmic hyperthyroidism is believed to be due to the fact that the exophthalmos is neither so great nor so rapidly produced in that disease as in exophthalmic ophthalmoplegia. In the case reported above, however, the ophthalmoplegia was present for at least three months while the exophthalmos was slight and non-progressive.

Treatment of the condition is known to be ineffective, and thyroidectomy makes no difference to either the exophthalmos or the ophthalmoplegia. Indeed, the exophthalmos often appears as a sequel to thyroidectomy. As a rule it progresses to its maximum and then remains stationary for life. Decompression of the orbit by removal of its roof, provided that it is done before permanent structural changes have arisen, is the only palliative measure that has met with success (Naffziger and Jones 1932). In the case under review it became necessary to perform thyroidectomy when thyrotoxicosis supervened, notwithstanding the probability that it would increase the ocular symptoms. Moreover, at one time, when the exophthalmos was progressing rapidly, the cornea had become severely ulcerated, and it seemed that the eye might have to be enucleated. This would have been an even greater risk, because cases have been reported in which the second eye has become affected at a later date.

EXOPHTHALMIC OPHTHALMOPLEGIA AS A CLINICAL ENTITY

Exophthalmic ophthalmoplegia has been regarded in the past either as an unusual complication of exophthalmic goitre or as evidence of the association of myasthenia gravis with thyrotoxicosis, a not uncommon event. That both these views are incorrect is shown by the following established facts:—

(1) Exophthalmic goitre is a disease of early adult life; the proportion of females to males affected is 9 to 1, and the maximal incidence is below the age of 40. Exophthalmic ophthalmoplegia is a disease of middle age; males preponderate, and the age of maximal incidence is over 40.

(2) In Graves's disease thyrotoxicosis is an essential disorder of function; in exophthalmic ophthalmoplegia thyrotoxicosis plays no essential part. Thyrotoxic symptoms, if present, are usually slight; and exophthalmos cannot now

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be regarded as primarily a symptom of thyrotoxicosis. In an important group the syndrome develops as a sequel to thyroidectomy, and then thyrotoxicosis may be altogether absent, the basal metabolic rate being normal or subnormal. Thyroidectomy has little or no influence on the main symptoms of exophthalmic ophthalmoplegia, in contrast to those of exophthalmic goitre.

(3) Exophthalmic ophthalmoplegia differs from myasthenia gravis complicating thyrotoxicosis in that the paralysis is nearly always limited to the ocular muscles; the characteristic fatigability of myasthenia gravis is absent; there is no variability of symptoms and no typically downhill course; and there is no response to prostigmin.

PATHOGENESIS OF EXOPHTHALMOS

It seems to be well established that the immediate cause of exophthalmos is a rise of tension within the cone of external orbital muscles, followed by œdema and cellular infiltration, leading to an increase in volume of the orbital contents. Contrary to general belief, this sequence of events can no longer be regarded as depending on hyperthyroidism, nor is it due to the action of thyroxine. Brain (1936) has shown that exophthalmos is only rarely produced by the administration of thyroid extract or of thyroxine to man or to animals. Again, it is well known that severe thyrotoxicosis often develops without exophthalmos—e.g., in toxic adenoma. Again, exophthalmos may arise in exophthalmic ophthalmoplegia when the patient is in the hypothyroid state.

On the other hand, Friedgood (1934) and Smelser (1937) have shown that the injection of thyrotropic hormone of the pituitary in intact animals produces thyrotoxicosis and exophthalmos; but that exophthalmos is more readily produced by this means after the thyroid gland has been removed. This does not imply that exophthalmos is directly due to the action of the thyrotropic hormone of the pituitary alone, for there is evidence that the administration of this principle in certain circumstances rapidly produces a refractory condition of the thyroid in which it is no longer sensitive to thyrotropic hormone. Moreover, there is the question of the production of antithyrotropic substance during the refractory phase, which Anderson and Collip (1934) have shown to be the case. Nevertheless, although this question has not been settled, it is probable that exophthalmos depends in some way on the action of the thyrotropic hormone rather than on thyroxine.

SUMMARY

A case of exophthalmic ophthalmoplegia is described in which the ophthalmoplegia was present for a long time before the onset of severe exophthalmos. This tends to disprove the idea that the ophthalmoplegia is the result of a rapidly produced exophthalmos.

The reasons for regarding exophthalmic ophthalmoplegia as an entity separate from exophthalmic hyperthyroidism are seen to depend on the higher age-incidence and the preponderance of males, and the fact that thyrotoxicosis plays no part in the disorder. The latter fact is confirmed by the frequent appearance of the syndrome after operations and during the hypothyroid state; by the difficulty of producing exophthalmos by injections of thyroxine in man and animals; and by the fact that thyroidectomy has little or no influence on the main symptoms.

Exophthalmic ophthalmoplegia differs from myasthenia gravis complicating thyrotoxicosis in that the paralysis is limited to the ocular muscles, fatiguability is absent, and there is no response to prostigmine.

The rôle of the thyrotropic hormone of the pituitary in the production of exophthalmos is discussed in the light of injection experiments in animals. Although it can be more rapidly produced by this means in animals who have had their thyroid gland removed exophthalmos cannot be regarded as directly due to the action of this hormone alone, because the refractory condition of the thyroid gland and the anti-thyrotropic substance of Collip and Anderson also play a part.

My thanks are due to Mr. W. R. Forrester Wood, of the Royal Sussex County Hospital, for operating on this patient.

References at foot of next column

COMBINED IMMUNISATION WITH TETANUS TOXOID AND T.A.B.

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Active immunisation against tetanus and the enteric fevers by means of tetanus toxoid and T.A.B. vaccine is recognised to be effective. Since the beginning of this century the established method of immunising against typhoid fever has been by two doses of typhoid vaccine at an interval of 7–10 days. Some 24 years ago simple typhoid vaccine was combined with the paratyphoid vaccine in the formula which is generally known as T.A.B. Immunisation with two doses of T.A.B. vaccine separated by an interval of 7–10 days is almost universal throughout the world.

Ramon and Zoeller (1927) were the first to immunise large numbers of human beings with tetanus toxoid, although it had been used for some years previously in animals. Since then, in man, various systems of dosage of tetanus toxoid have been used, but that advocated by Boyd (1938), and adopted by the British Army, is of two doses separated by an interval of at least 6 weeks. Ramon and Zoeller (1927) have shown that if tetanus is administered with T.A.B. vaccine the antitoxic response to the toxoid is greater than if it is given alone. The method used by Ramon (1939) is three doses of the vaccine-toxoid mixture with intervals of 2 or 3 weeks between doses.

If the immunisation of large numbers could be accomplished by two doses of the combined antigen it would have obvious advantages. Our problem was to decide whether a satisfactory response to the vaccine and the toxoid could be obtained by giving both combined, at some interval between 7–10 days (the traditional interval for T.A.B. vaccine) and 6 weeks (the recommended interval for tetanus toxoid). This necessitated first demonstrating that a good antitoxic response could be produced to tetanus toxoid when the interval between the two doses was less than the usual 6 weeks; from preliminary experiments in man we were led to believe that an interval of 4 weeks was sufficient. Secondly, it had to be established that prolonging the interval between the doses of the T.A.B. vaccine from 7 days to 4 weeks did not interfere with the well-established immunity which is known to result when the interval is 7–10 days.

Combined T.A.B. vaccine and tetanus toxoid.—We have called this combined antigen T.A.B.T. To prepare it, T.A.B. vaccine, ten times the normal strength, was incorporated into tetanus toxoid in two different proportions, so that 1 c.cm. of the mixture contained either the usual first dose or the usual second dose of T.A.B. vaccine, as follows:—

(1)		(2)	
B. typhosus ..	500 million	*B. typhosus* ..	1000 million
B. paratyphosus A	250 ,,	*B. paratyphosus* A	500 ,,
B. paratyphosus B	250 ,,	*B. paratyphosus* B	500 ,,
Tetanus toxoid ..	0·9 c.cm.	Tetanus toxoid ..	0·9 c.cm.

The population tested consisted almost entirely of residents, nurses, students, and laboratory staff of the hospital. Some were given tetanus toxoid and T.A.B. vaccine separately and some received the combined antigen (T.A.B.T.); the intervals between the doses were varied, as follows:—

Tetanus toxoid alone. Two doses of 1 c.cm. at intervals (*a*) of 4 weeks, (*b*) of 6 weeks between doses.

DR. MCGREGOR: REFERENCES

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T.A.B. vaccine alone. The usual first and second doses at intervals (*a*) of 1 week, (*b*) of 4 weeks between doses.

T.A.B.T. Two doses of 1 c.cm. of the combined vaccine at intervals (*a*) of 4 weeks, (*b*) of 6 weeks between doses.

It was impossible to examine the blood of every inoculated subject, so from each batch subjects were selected who were bled 14 days after the immunisation, and their sera were tested for the presence of tetanus antitoxin, and for agglutinins to the typhoid bacillus and the paratyphoid bacilli A and B.

RESPONSE TO TETANUS TOXOID

The response to tetanus toxoid was measured by injecting into mice mixtures of a test dose of tetanus toxin and graded amounts of patient's serum, taken 14 days after the second dose. The results obtained are shown in table I.

TABLE I—ANTITOXIC RESPONSE TO TETANUS TOXOID

Method of immunisation	No. of cases	International units per c.cm. of serum								
		Group analysis					Highest titre	Lowest titre	Average titre	Geometric mean
		< 0·1	0·1–1·0	1·0–2·0	2·0–5·0	> 5·0				
Toxoid only: 4-weeks interval	30	1 *3%*	20 *67%*	3 *10%*	6 *20%*	—	3·0	0·06	0·94	0·67
Toxoid only: 6-weeks interval	8	—	4 *50%*	4 *50%*	—	—	1·8	0·21	0·93	0·84
T.A.B.T.: 4-weeks interval	23	—	—	3 *13%*	8 *35%*	12 *52%*	26·0	1·4	*a* 5·8 *b* 5·0*	*a* 4·5 *b* 4·2*
T.A.B.T.: 6-weeks interval	5	—	—	—	4 *80%*	1 *20%*	5·2	3·2	4·2	4·2

* In this calculation the exceptional result of 26 units was omitted.

Subjects inoculated with two doses of tetanus toxoid at an interval of 4 weeks all developed antitoxin in their blood; the average antitoxic titre was 0·94 unit per c.cm., which is in accord with the published results of Ramon, Boyd and others. In a few cases, where the interval between the doses was 6 weeks instead of a month, there was no material difference in the results. Those inoculated with two doses of the combined vaccine-toxoid mixture (T.A.B.T.), however, showed in their serum a much higher titre of antitoxin, and the average in the series of those who had two doses at an interval of 4 weeks was 5 units per c.cm. The sera of two-thirds of those who received two doses of tetanus toxoid alone gave a titre of under 1 unit per c.cm., whereas with the T.A.B.T. no serum had an antitoxic content of less than 1 unit per c.cm., and half of them had 5 units or more. One exceptional subject reacted to these two doses of T.A.B.T. at 4-weeks interval with the production of 26 units of tetanus antitoxin per c.cm. in his serum.

These results confirm Ramon's contention that when tetanus toxoid is combined with T.A.B. vaccine the yield of antitoxin is higher than when it is given alone, and they show also that with only two doses given at a shorter interval than usual a very high degree of immunity can be obtained to tetanus—much higher than is usually considered necessary to protect against the disease.

In a small group the interval between the two doses of T.A.B.T. was extended to 6 weeks, but the antitoxic response of their sera was substantially the same as that for the group which received two doses of T.A.B.T. at 4-weeks interval; a high degree of immunity was attained. There is no necessity to prolong the interval to 6 weeks. Among the sera tested there were a small number from people who, for some reason or other, had only had one dose of the combined antigen, and for whom the rest of the immunising course had been by tetanus toxoid or T.A.B. vaccine given alone. Twelve of these sera were tested and it was found that the average titre of antitoxin was 1·8 units per c.cm., which was higher than those which had two doses of tetanus toxoid alone, but much lower than those which had two doses of the combined antigen.

RESPONSE TO T.A.B. VACCINE

The test employed to ascertain the response of the inoculated individual to the antigens of this vaccine was the agglutination reaction. Opinions differ as to the value of this reaction as an index of immunity, but there is no doubt that it is a measure of the response to an antigen, and thus it serves the present purpose. The results obtained, which are shown in table II, show that prolongation of the interval between two doses of T.A.B. vaccine from 1 to 4 weeks does not alter the degree of response to the antigens of the vaccine. We may conclude, therefore, that the immunity conferred by two doses (combined with tetanus toxoid) given at 1-month interval is as great as that conferred by the usual two doses given at the shorter interval of 7–10 days.

REACTIONS FOLLOWING T.A.B.T.

The degree of reaction following the administration of T.A.B. vaccine is now well known. In the present series of inoculations 642 injections of T.A.B. vaccine alone were given, and there was only one excessive reaction in a subject who subsequently gave clinical evidence of an exacerbation of a gall-bladder infection. Out of 482 injections of tetanus toxoid alone there was only one severe reaction, in a person known to be allergic to ordinary nutrient broth. He had a rigor within half an hour of the second injection, which was promptly controlled by the administration of adrenaline. Usually there was no discomfort, local or general.

The number of persons receiving T.A.B.T. was over 500, and the reactions were, so far as could be judged, exactly the same as would have resulted from T.A.B. vaccine alone. The addition of tetanus toxoid did not in any case appear to increase the reaction. In the comparatively few cases (53) who received the second dose of T.A.B.T. 6 weeks after the first there were 4 in whom the reaction was exceptionally severe. The numbers are so small that it is impossible to say whether the subject had become sensitive to the antigens during the longer interval, but this could be brought out in a more extended series. If so, it would, of course, be a strong indication for shortening the interval between doses as far as possible.

TABLE II—RESPONSE TO T.A.B. VACCINE

Subjects with no history of enteric fever or inoculation. Inoculation with T.A.B. vaccine. Tested 14 days after second dose

Method	No. of cases	Dilutions of sera giving standard agglutination											
		Ty. H		Ty. O			Para. A (H)				Para. B (H)		
		1/1600	1/800	1/400	1/200	1/100	1/1600	1/800	1/400	1/200	1/1600	1/800	1/400	1/200
Two doses at 7-days interval	15	10 *66%*	5 *33%*	1 *7%*	10 *66%*	4 *26%*	2 *13%*	5 *33%*	7 *47%*	1 *7%*	1 *7%*	3 *20%*	4 *26%*	7 *47%*
Two doses at 28-days interval	15	9 *60%*	6 *40%*	3 *20%*	10 *66%*	2 *13%*	3 *20%*	4 *26%*	6 *40%*	2 *13%*	8 *53%*	6 *40%*	1 *7%*	..

DISCUSSION

At present the immunisation of communities against tetanus and the enteric fevers is of great practical importance. Many observers have shown that it can be done, but there is no uniform method of achieving immunity with a minimum number of injections and in a reasonably short space of time. If the recognised

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intervals between doses are adhered to, three injections at least are required, even if both antigens are combined in the first dose, and immunity to tetanus is not reached for some 8 weeks after the beginning of the course. We have confirmed Ramon's contention that when tetanus toxoid is administered in combination with T.A.B. vaccine the antitoxic response is much greater than when the toxoid is given alone. Our figures show that it is five times as great, and that after two doses of the combined antigens (T.A.B.T.) given 4 weeks apart, every subject tested had over 1 unit per c.cm. of tetanus antitoxin in his serum—a quantity which, as far as we know, is much in excess of that required to ensure immunity against tetanus. We have shown, also, that with injections separated by an interval of 4 weeks the immunity response to the antigens of T.A.B. vaccine are as good as with the usual interval of 7–10 days.

Procedure in combined immunisation against tetanus and the enteric fevers will vary according to the circumstances. If there is imminent danger of enteric fever, then the first inoculation should be of the combined vaccine (T.A.B.T.), but in order to obtain immunity rapidly to the enteric fevers a second dose of T.A.B. should be given after 7–10 days. There would be no harm in giving T.A.B.T. as a second dose, since the reaction is not greater than with T.A.B. alone, and the immunisation to the enteric fevers is not diminished by the combination of T.A.B. with tetanus toxoid. A third injection of tetanus toxoid, however, would have to be given at a later date (1 month or more after the first dose) to ensure efficient protection against tetanus. If there was no imminent danger of typhoid or paratyphoid—that is, if there were no outbreaks in the neighbourhood—the method of choice would be two inoculations of T.A.B.T. at an interval of a month. This would mean that 6 weeks after the first dose the individual would have a good immunity to both diseases, and would only need two inoculations. In these days the risk of tetanus after wounds is always imminent. When the tetanus toxoid is combined with T.A.B. vaccine, an interval of not more than 4 weeks is necessary to get full immunity.

In the absence of an enteric outbreak we recommend giving two doses of T.A.B.T. at 1-month interval, the first dose including the usual first dose of T.A.B. and the second the usual second dose of T.A.B., each incorporated with 0·9 c.cm. of tetanus toxoid. It is customary to revive the immunity of an inoculated person to the enteric fevers by giving a dose of T.A.B. vaccine each year he remains exposed to the disease. By giving a full dose of T.A.B.T. instead of only T.A.B. vaccine we can ensure a continued immunity to the enteric fevers; and the repeat, or boosting, dose of tetanus toxoid, after this long interval, will help to maintain immunity to tetanus, as recommended by Ramon (1939).

SUMMARY

We wished to immunise men simultaneously against tetanus and the enteric fevers, with the minimum number of inoculations, and found that the simplest effective method was to give two doses of the combined antigens (T.A.B.T.) at an interval of 4 weeks.

The response to the antigens of the T.A.B. vaccine was as good as if these were administered at the usual short interval of 1 week.

The amount of tetanus antitoxin in the serum of the immunised man was over five times as great as it was in those who had two doses of tetanus toxoid alone at intervals of 4 or 6 weeks. Every subject tested who had been immunised with two doses of T.A.B.T. at 4-weeks interval had an antitoxic titre of over 1 unit of antitoxin per c.cm. in his serum, which is much higher than that which is accepted as an immunising level against tetanus. In 50% the antitoxic titre rose to 5 units or more per c.cm., which is many times higher than would be reached by the usual prophylactic dose of tetanus antitoxin.

The reaction to the combined antigens (T.A.B.T.) was no greater than to the T.A.B. vaccine alone.

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TRAUMATIC RUPTURE OF THE INFRAPATELLAR TENDON

RESULTS OF REPAIR BY FASCIAL SUTURE

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TRAUMATIC rupture of the infrapatellar tendon is described as taking place usually at its upper or its lower attachment. In the two cases with which I have had to deal the rupture took place in the middle of the tendon. The ends were so frayed out, like a shaving-brush, that there seemed to be no possibility of suture by the ordinary methods of stitching. The cases were treated by fascial suturing forthwith and are presented to indicate the excellence of the results thus obtainable.

CASE-RECORDS

CASE 1.—A stout woman, aged 65, slipped when stepping off a tramcar on Jan. 6, 1939. There was a painful snapping sensation across the front of the knee, and she was unable to rise from the ground. Great swelling of the knee developed and all power of active extension was lost. A gap was palpable at the site of the ruptured infrapatellar tendon and the patella displaced upwards.

At operation on Jan. 12, 1939, the affected area was exposed through a semicircular horizontal incision. The joint was full of blood-clot, there were transverse rents in the lateral quadriceps expansions, and the infrapatellar tendon was found completely torn across at its middle. The ends were too frayed to be sutured. The blood-clot was removed. Two thin strips of fascia lata, 10 in. long and ⅛ in. wide, were cut with a fasciotome, an instrument rather like a Mayo vein stripper, provided with a ring knife at the end, which is controlled with a screw in the handle. It avoids the need for long incisions in the thigh to obtain fascial strips. The fascial needle, armed with the fascia, was passed through a tunnel bored transversely through the lower border of the patella and similarly through the bone and periosteum at the tibial tubercle. A second suture was employed and a good grip, without tension, obtained in the extended position of the knee. The frayed ends of the tendon were left in contact. The torn quadriceps expansions, which had given way transversely at the same level as the ruptured infrapatellar tendon, were sutured with six interrupted sutures of twenty-day No. 2 tanned catgut, three on each side. After closure a plaster casing was applied from the toes to the groin, with the knee immobilised in a position just short of complete extension, this position being preferable to fixation in complete extension for the restoration of movement later. The lower end of the bed was raised on blocks for a few days.

From the beginning of the postoperative period the function of the quadriceps muscle was promoted by the surgeon lifting the limb off the bed three times twice daily and requesting the patient to try to assist the movement. Ten days after the operation the patient was instructed in daily contractions of the quadriceps muscle as it lay in the plaster. The dressings remained unchanged for three weeks, and healing was complete. Massage and movements were not begun for six weeks after the operation, and massage of the site of the operation was avoided. The patient made excellent progress and now has a strong useful limb. She practised quadriceps drill well. There is good substance and tone in the muscles of the thigh, full movements of the knee have returned, and the patella is back in its normal position. To inspection and palpation it is obvious that there has been complete repair and restoration of the infrapatellar tendon. Re-education in walking was supervised, so that she does not require a stick; she leads an active life and walks without a limp.

CASE 2.—A labourer, aged 34, slipped while lifting a cask off a lorry on March 2, 1932, and tore the tendon. The clinical features and the conditions observed at operation were similar to those in case 1, and the treatment was the same. He returned to full work four months after the accident and has never been off his work since. He now has a perfect limb in every respect.

Fascial sutures are not absorbed easily. The tissues tend to expel the invaders in the beginning. It is wise,

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therefore, to be sparing in their use. The temptation is to use too many strips, or strips that are too thick. In the after-treatment strict fixation of the part and non-interference with the wound for at least three weeks are practised. Massage and movement should not be started before six weeks has elapsed. If the stitches are taken out too soon and too much liberty permitted, and if massage and movements are begun too soon, the wound is apt to break down, and a tedious convalescence, from sloughing of the fascia, may follow. Unfortunate results from fascial suturing which have come under my notice have been due to failure to observe these points. Failure may result from infection due to operating before scratches and blisters caused by the trauma having healed properly. Very occasionally, late postoperative infection and sloughing of fascia may follow the onset of pneumonia in elderly people.

SUMMARY

Two cases of traumatic rupture of the infrapatellar tendon treated by fascial suture are reported. In both cases power and full movement were restored to the limb.

Fascial sutures are not easily absorbed, and therefore should be few and thin. To minimise the danger of infection and sloughing, operation should not be undertaken until skin abrasions have healed, and massage and movement should be postponed until six weeks after operation.

HÆMORRHAGIC THROMBOCYTHÆMIA

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Chronic bleeding associated with a decreased number of circulating blood-platelets is well known under the term "thrombocytopenic purpura." There is, however, a rare hæmorrhagic disorder associated with an increased number of circulating blood-platelets. An example of it is described here, and the name "hæmorrhagic thrombocythæmia" is proposed.

CASE-RECORD

A woman, aged 71, developed lobar pneumonia in January, 1940, with signs of consolidation at the right base. She rapidly improved after adequate treatment with sulphapyridine and was afebrile from the eighth to the fourteenth day. On the fifteenth day fever recurred and pain and tenderness appeared in the left buttock and behind the left knee; œdema of the left ankle developed later. Thrombosis in the deep veins of the left thigh was diagnosed.

The patient was kept in bed, and in the sixth week of her illness a small hæmatoma, about the size of an almond, appeared above the right wrist, surrounded by bruised skin, without any history of injury. She then said that for the past eight years numerous hæmatomata, varying in size from that of an almond to that of an orange, had arisen in different parts of her body, occasionally spontaneously, but more commonly after injury. Moreover she had a tendency to prolonged bleeding after minor accidents, such as cutting a finger, or after extraction of a tooth. She had also had "anæmia and rheumatism in adolescence"; at 39 she had had a serious febrile illness lasting ten weeks; and at 40 she had had her uterus removed. One of her brothers had died of lymphatic leukæmia in his 68th year.

The patient showed little abnormality apart from a sallow complexion, a red smooth tongue, and a palpable spleen, but only while she had fever. Blood-pressure 160/100; signs of arteriosclerosis, hypertrophy of the heart, slight albuminuria, and diminished renal function. Wassermann reaction negative; gastric contents withdrawn an hour after a gruel meal contained 0·2% of free hydrochloric acid, total acidity being 0·29%.

Blood-counts.—Details of complete blood examinations carried out on six occasions in six months are shown in table I. Hæmoglobin 80–88% (Sahli); red cells 4·76–5·05 million per c.mm.; and white cells 14,000–18,000 per c.mm. Stained films showed polychromasia, a slight anisocytosis, and a few poikilocytes. The increase in the leucocytes was principally due to a neutrophil polymorph leucocytosis, and most of the white cells were mature, though a few myelocytes were present. The mean diameter of the red cells was 7·1 μ, but the diameter varied more than normal (Jones 1933).

TABLE I—BLOOD EXAMINATIONS

Date in 1940	Packed red-cell volume %	Hb. (g. per 100 c.cm.)	Red cells (million per c.mm.)	White cells per c.mm.	Differential white-cell count (%)						Platelets (millions per c.mm.)
					Polymorphs			Lympho-cytes	Mono-cytes	Myelo-cytes	
					Neutro-phil	Eosino-phil	Baso-phil				
Jan. 10	39·5	13·6 (80%)	5·02	14,000	84·0	1·0	1·0	9·6	4·1	0·2	1·730
„ 17	38·0	..	..	..	81·0	0·8	0·4	12·1	5·3	0·2	3·060
Feb. 13	40·0	13·6 (80%)	4·76	14,800	<	79·5	>	15·0	5·3	0·2	3·800
„ 20	39·0	14·1 (83%)	4·58	18,000	80·0	1·6	1·0	15·0	2·0	0·2	3·640
„ 28	44·0	14·9 (88%)	4·98	14,500	81·6	—	2·0	12·4	3·8	0·2	3·630
June 25	51·0	14·4 (85%)	5·05	16,000	81·6	2·4	3·4	10·2	4·0	..	2·160

The outstanding finding was the great increase in the number of circulating blood-platelets (fig. 1). Platelet counts, carried out by my modification* of Gram's (1920) method, were 1,730,000–3,800,000 per c.mm. In wet preparations the platelets varied much in size and shape. In stained films large masses of agglutinated platelets were found, but in similar films prepared from citrated venous blood they did not clump together and they varied in size from the normal to that of a red corpuscle. In the great majority of platelets there was no deficiency of granules, but in a few, especially the larger platelets, the granules were scanty and finer.

Bone-marrow.—Sternal puncture was performed on two occasions. Eight hours after the second sternal puncture capillary hæmorrhage started at the site of puncture and continued for six hours. The proportion of nucleated cells in the aspirated bone-marrow was high on both occasions (for differential counts see table II). There was no evidence of any major disturbance in the precursors of the red corpuscles or in the polymorph leucocytes, apart from a slight increase in the percentage of the more primitive cells of both series. The essential abnormality was the extraordinary increase in the number of megakaryocytes and platelets (fig. 2).

TABLE II—BONE-MARROW

Type of cell	Jan. 17, 1940 Total cells counted = 750	Feb. 28, 1940 Total cells counted = 350
	%	%
Myeloblast	2·4	2·9
Promyelocyte	28·7	4·1
Myelocyte		20·0
Polymorphs { Young	38·0	8·0
band		17·0
Segmented forms ..		15·2
Lymphocytes	8·4	3·0
Monocytes	1·0	1·6
Normoblast { Basophilic ..	5·6	7·3
Polychromatic ..	9·3	14·4
Orthochromatic ..	3·6	3·8
Unclassified	2·1	3·0

* Venous blood, 2 c.cm., obtained with a paraffined needle and syringe, is added to a small paraffined graduated cylinder containing 0·5 c.cm. of a 3·8% solution of sodium citrate. Sufficient time is allowed to elapse (½–¾ hr. when the sedimentation-rate is normal) until plasma free from red cells can be taken into a white-cell pipette and a 1/20 dilution made with a 2% solution of formalin in physiological saline. Thorough mixing of the contents of the pipette is essential before a counting-chamber is filled; 15 min. later more than 500 platelets are counted with a 1/6 objective and the condenser screwed halfway down. A hæmatocrit reading of the specimen is necessary.

Calculation.—Number of platelets per c.mm. of blood = $n\left(\frac{W}{V}+\frac{P}{100}\right)$ where V = volume of blood; W = volume of sodium citrate; n = number of platelets per c.mm. of diluted plasma; and P = the percentage plasma volume.

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Numerical expression of the marrow megakaryocytes is of necessity only an approximation, but Limarzi and Schleicher (1940) give the following figures for ten healthy persons: 58·8 megakaryocytes per million nucleated cells and 52·2 in an 18 mm. square. In the patient described there were 11,000 megakaryocytes per million nucleated cells and 250 in an 18 mm. square. These cells were classified into (1) megakaryoblasts with a finely reticulated nucleus and a strong basophilic cytoplasm containing no azurophil granules and (2) megakaryocytes with azurophil granules; the latter were further subdivided into the following categories:—

(*a*) Immature forms with a coarsely reticulated nucleus and a fairly strong basophilic cytoplasm containing relatively few granules;

(*b*) Mature cells in which the nucleus was coarsely stippled and the cytoplasm weakly basophilic and packed with azurophil granules;

(*c*) Degenerate forms with a ragged outline, a coarsely stippled nucleus, and a relatively small amount of weakly basophilic cytoplasm containing few granules.

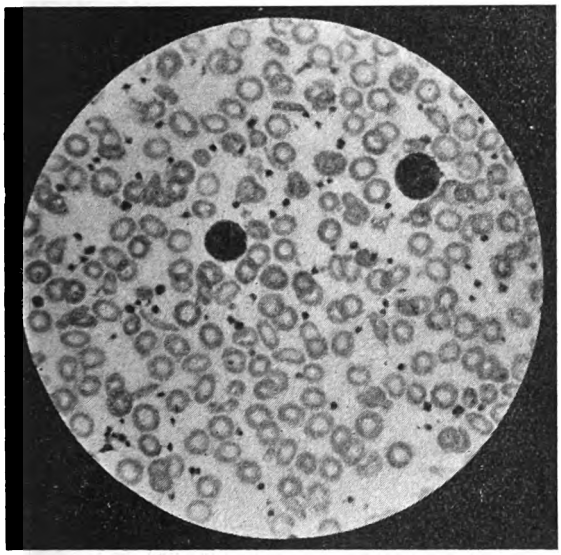

FIG. 1—Blood film (Leishman's stain) showing great increase in blood-platelets (3,060,000 per c.mm.) (× 500.)

On the basis of this classification the differential count of the cells of the megakaryocyte series was:—

Megakaryoblasts		11 (4%)
Megakaryocytes		241 (91%)
Immature	31 (12%)	
Mature	150 (56%)	
Degenerate	60 (23%)	
Unclassified		13 (5%)

All stages in the development from megakaryoblast to degenerate cells were seen. A few cells appeared to contain fully developed platelets within the cytoplasm (fig. 3), and others seemed to have ingested red cells and leucocytes, but the possibility of artificial production of this phenomenon in the preparation of the film could not be excluded. A few mature megakaryocytes showed vacuolation of the cytoplasm and clumping of granules (fig. 4). The shape of the nucleus of the megakaryocytes varied; a few cells had multiple round nuclei. In most cells the nucleus had a smooth slightly irregular contour and was oval, although in many instances it seemed to be composed of small round nuclei massed together.

Other tests.—The bleeding-time (Duke 1915) was a little longer than normal on three occasions and was once prolonged to 15 min. The capillary-resistance test (Göthlin 1937), the coagulation-time (Lee and White method modified), the prothrombin index (Quick et al. 1935), and clot retraction were all within normal limits. Repeated examination of the blood revealed no significant quantitative abnormality in the plasma proteins, non-protein nitrogen, cholesterol, chlorides, and calcium. The erythrocyte sedimentation-rate (Westergren) was normal.

DIAGNOSIS

An increase in the number of circulating blood-platelets may be found after hæmorrhage, parturition, and surgical operations, especially splenectomy; during convalescence from acute infections; in the anæmia of chronic sepsis, tuberculosis, chronic hæmorrhage, and malignant disease; in pernicious anæmia during a remission; and in polycythæmia vera, chronic myeloid leukæmia, and lymphadenoma. A tendency to hæmorrhage in association with a high platelet count has, however, only been previously described in polycythæmia vera (Weber and Bode 1929) and chronic myeloid leukæmia (Minot and Buckman 1925). Further, in these conditions the increased platelet count is temporary and generally moderate. It may be regarded as a thrombocytosis, with the same implication for platelets as leucocytosis has for white cells. The name "thrombocythæmia" is best reserved for a "permanent" increase in the number of circulating blood-platelets, usually severe and the outstanding abnormal finding. Therefore it seems justifiable to consider the condition described as a new entity because of the duration of the disease, the extremely high platelet count associated with a tendency to hæmorrhage and thrombosis in the absence of signs of polycythæmia vera or of myeloid leukæmia in the blood and bone-marrow. The term "hæmorrhagic thrombocythæmia," as first applied by Epstein and Goedel (1934), is suggested because it focuses attention on the clinical manifestations without implying any knowledge of ætiology.

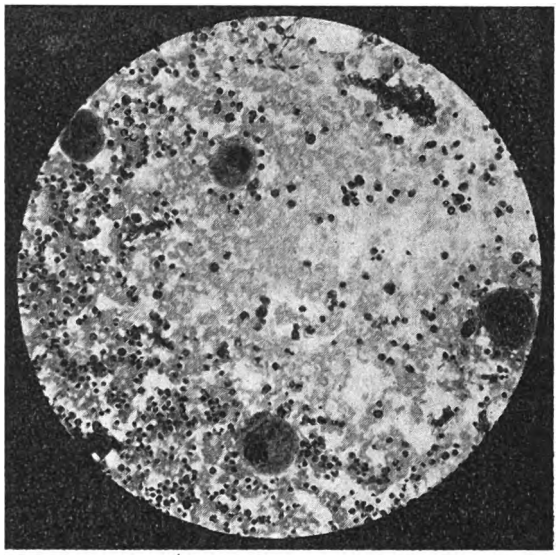

FIG. 2—Bone-marrow film from sternal puncture (Leishman's stain) showing increased number of megakaryocytes and a mass of blood-platelets. Normally a megakaryocyte is only seen after search in many fields. (× 100.)

SIMILAR CASES

Five published reports have been found which describe conditions resembling the present case in their clinical and hæmatological manifestations.

Epstein and Kretz (1930) and Epstein and Goedel (1934) published the record of an elderly man who had a tendency to hæmorrhage and thrombosis associated with a high platelet count (1·2–2·2 million per c.mm.). The course of the disease was followed for four years, when the patient died. At autopsy extreme atrophy of the spleen (weight 7 g.), arteriosclerosis, and an increase in the number of megakaryocytes in the bone-marrow were found. Hæmorrhagic thrombocythæmia was diagnosed.

Drake (1936) described a hæmorrhagic disorder associated with a high platelet count (1·0–2·58 million per c.mm.) in a woman, aged 65, with slight cardiac decompensation. The spleen and liver were just palpable. There was no anæmia, but the leucocyte count was moderately increased. Normoblasts, a few myeloblasts, myelocytes, and megakaryocytes

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were present in the blood. Myeloid leukæmia was diagnosed because of the increased white-cell count, the presence of immature leucocytes in the blood, and the enlargement of liver and spleen.

This evidence, however, is considered to be inconclusive in the absence of proof of leukæmic infiltration of organs, for a similar blood-picture may be met with in leucoerythroblastosis (Vaughan 1936, McMichael and McNee 1936), myeloid megakaryocytic hepatosplenomegaly (Downey and Nordland 1939), and in phases of hæmorrhagic thrombocythæmia (Uotila 1938). In view of these facts and the similarity of the clinical manifestations the patient has been included in the hæmorrhagic-thrombocythæmia group.

Uotila (1938) reported a condition essentially similar to that

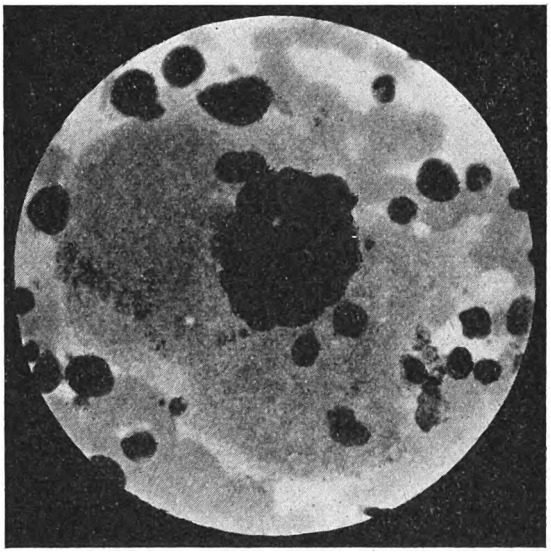

FIG. 3—Bone-marrow film from sternal puncture (Leishman's stain) showing mature megakaryocyte with some fully formed platelets within the cytoplasm. (× 500.)

described by Epstein, Kretz and Goedel. A platelet count of 5 million per c.mm. was found on one occasion. Sternal puncture revealed a great increase in the number of megakaryocytes in the bone-marrow.

Rowlands and Vaizey (1938) described two patients with a tendency to hæmorrhage and thrombosis associated with an increased platelet count (0·5–1·7 million per c.mm.). One patient suffered from idiopathic steatorrhœa, and, since prothrombin estimations were not carried out, it is impossible to say what part a deficiency of prothrombin played in the production of hæmorrhage. In neither of these cases nor in that of Drake was sternal puncture carried out.

COMMENTS

The common signs and symptoms of the syndrome are a tendency to hæmorrhage and thrombosis associated with arteriosclerosis, great increase in the number of circulating blood-platelets, moderate leucocytosis, polychromasia, anisocytosis, and poikilocytosis, with or without anæmia, and great increase in the number of megakaryocytes in the bone-marrow.

Other disorders of the hæmopoietic tissues which involve platelets and their precursors are :—

(1) Émile-Weil et al. (1933, 1936), Downey and Nordland (1939), Tudhope (1937), and Hewer (1937) refer to moderate enlargement of the liver and gross splenomegaly due to myeloid transformation. Multiple growths of hæmopoietic tissue, containing numerous megakaryocytes, were found throughout the spleen. There was no myeloid infiltration of other organs ; hence a leukæmic process was ruled out. The blood-picture was that of hypochromic anæmia or leucoerythroblastosis, and the platelet count was normal or subnormal. The term "myeloid megakaryocytic hepatosplenomegaly" was applied to the condition, and chronic intoxication (tuberculosis or chronic infection) was considered by Émile-Weil to be the causal agent.

(2) Bianchi (1921), Dubinskaja (1928), Downey, Palmer, and Powell (1930), Gaudier and Houcke (1930), Favre et al. (1934) dealing with a somewhat similar condition regarded it as an aleukæmic megakaryocytic myelosis ; but, as was later pointed out by Downey and Nordland (1939), organs other than liver and spleen were not examined for myeloid infiltration in certain cases of this group.

(3) Complete myelosis of di Guglielmo (1920), in which red cells, white cells, and megakaryocytes were considered to be involved in a leukæmic process.

It is probable that these conditions are all closely related. Hæmorrhagic thrombocythæmia and myeloid megakaryocytic hepatosplenomegaly have much in common. In both a chronic disorder of hæmopoiesis, chiefly involving the megakaryocytes, affects elderly

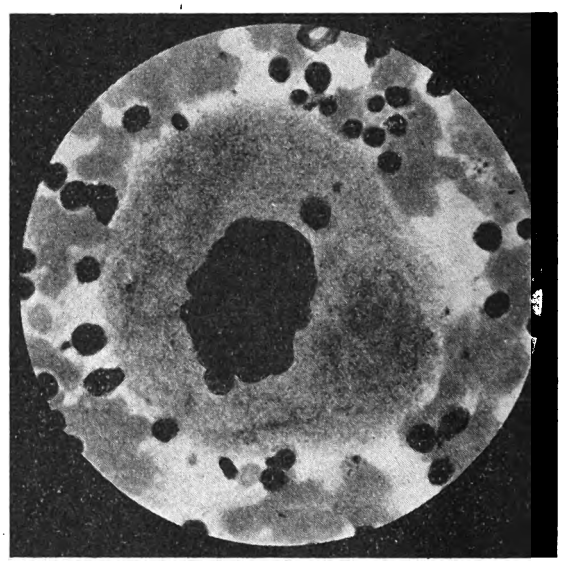

FIG. 4—Bone-marrow film from sternal puncture (Leishman's stain) showing mature megakaryocyte with condensation of granules. ? Early stage in formation of platelets. (× 500.)

persons. The hyperplasia of megakaryocytes affects the spleen in the one, the bone-marrow in the other. The different clinical manifestations may be explained on this ground. In hæmorrhagic thrombocythæmia the essential symptoms are those of thrombosis and hæmorrhage, presumably due to the thrombocythæmia. In hepatosplenomegaly the symptoms are mainly attributable to the great enlargement of the spleen. Though there is a hyperplasia of megakaryocytes in the spleen, there is no increase in the number of circulating blood-platelets.

Epstein and Goedel (1934) and Uotila (1938) consider that disease of the spleen is the essential factor in the causation of hæmorrhagic thrombocythæmia. They base this conclusion on the extreme splenic atrophy found at autopsy in the one case and regard the blood-picture of erythrocytosis, anisocytosis, Howell-Jolly bodies, leucocytosis, and high platelet count as identical with that found after splenectomy. They favour the hypothesis of Hirschfeld and Lauda (1937) that the spleen secretes a hormone regulating and restraining the activity of the bone-marrow, and they suggest that splenic dysfunction is the most important pathogenic factor. The existence of such a substance in the spleen has not yet been proved. A stronger argument in favour of splenic dysfunction being an essential factor in the production of hæmorrhagic thrombocythæmia is afforded by the work of Rosenthal (1925), who described patients having "splenic anæmia" with a normal or a slightly subnormal platelet count and no hæmorrhagic disorder before operation, in whom a permanent thrombocythæmia, associated with a tendency to thrombosis and hæmorrhage, developed after splenectomy.

SUMMARY

(1) A syndrome has been described for which the term "hæmorrhagic thrombocythæmia" seems suitable.

(2) The disease is chronic and affects elderly patients.

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(3) There is no suggestion that either heredity or defective diet plays any part in its causation.

(4) A tendency to hæmorrhage is a characteristic feature, but the manifestations are variable. Hæmorrhage from the gums, hæmatomata (with or without injury), and bruising of the skin may be found together or separately. Small hæmorrhages (petechiæ) are not a feature.

(5) Thrombosis of the larger veins of the leg, the splenic vein, mesenteric vessels, and vessels of the toe, leading to gangrene, developed in different patients.

(6) The bleeding-time was occasionally normal but usually prolonged. The coagulation-time was normal.

(7) Arteriosclerosis was present in five of the six patients.

(8) Three patients had slight splenomegaly, but one of these only during fever. In one of the others splenic atrophy was found at autopsy.

(9) Glossitis was present in three cases.

(10) Gastric analysis revealed that free hydrochloric acid was absent in two cases and present in two.

(11) The red cells numbered 2·73 to 7·25 million per c.mm. A hypochromic anæmia was present at some time in three patients. Polychromasia, anisocytosis, poikilocytosis, and normoblasts were found in four, and Howell-Jolly bodies in two patients.

(12) The leucocyte count was always increased (12,000–43,000 per c.mm.) owing mainly to a neutrophil polymorph leucocytosis and occasionally to a monocytosis and eosinophilia. A few myelocytes were found in the blood in three patients. A few myeloblasts, myelocytes, and megakaryocytes were found in one.

(13) The number of circulating blood-platelets was much increased. Counts over 1·5 million per c.mm. were common. Extreme variation in size and shape was found.

(14) The bone-marrow examined in two patients by sternal puncture showed evidence of increased erythropoiesis and granulopoiesis, but the excessive number of platelets and megakaryocytes was the outstanding abnormality. In a third case little can be said of the bone-marrow because of post-mortem change, except that there was an increase in the number of megakaryocytes.

I wish to thank Sir Robert Muir and Prof. J. W. McNee for advice and criticism in the preparation of this paper, and Mr. J. Kirkpatrick, of the pathology department in the University of Glasgow, for care in the preparation of photomicrographs.

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EFFECT OF SMOKE ON BACTERIA IN THE AIR

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IN the course of our investigations on germicidal aerosols we examined the possibility of interference with the activity of the germicide mists by different kinds of smoke, more especially tobacco smoke; such smokes may consist of solid or liquid particles or both. In the first experiment S^2NaOH * was utilised as the germicidal aerosal, exhaled cigarette smoke as the smoke and a broth emulsion of *Escherichia coli* for producing the bacterial suspension. It was found that the smoke exhaled from an ordinary cigarette completely annulled the activity of the germicide which was in a concentration sufficient, in the absence of smoke, to kill 50% of the test organism in 5 min. and 100% in 15 min. The smoke in the control chamber where there was no S^2NaOH had no apparent effect on the bacteria.

The experiment was repeated with the smoke from a known weight of cardboard damped with a 2% solution of potassium nitrate and dried. Here the effect of the smoke on the activity of the germicidal aerosol could not be demonstrated because this smoke, unlike tobacco, proved to be highly lethal to *E. coli*. The atmosphere of the control chamber containing none of the S^2NaOH germicide was completely sterilised within 5 min. by the smoke in a concentration of 1 g. in 10 cu. m. of air. This was an astonishing result and it suggested that the experiments with tobacco required repetition. *E. coli*, however, is not a suitable test organism for air-disinfection experiments; the two smokes were therefore tried with a standard test organism—the "F" coccus.† Against this coccus the cardboard smoke did not give quite such good results as against *E. coli*. On the other hand, tobacco heated on a hot plate instead of being smoked as a cigarette gave a definite kill of the F coccus.

The lethal effect of some other kinds of smoke was then tested, the materials used to produce smoke being gear-grease heated on an electric plate, cotton-wool, and oak and yang shavings damped with the potassium nitrate solution and subsequently dried. These also proved to be lethal to the F coccus, and to find out their relative activity various concentrations were used. Table I shows the percentage of surviving F cocci in the smoke chamber after exposure to the various smokes for different periods, compared with the percentage surviving in the control chamber. The smoke concentrations are expressed as the number of cubic metres of air which contain 1 g. of smoke. The weight of material smouldered is reckoned, in this equation, as being completely used up.

EFFECT ON SALIVARY ORGANISMS

It appears from these results that concentrations of smoke lower than 1 g. in 60 cu. m. of air have little bactericidal activity on the F coccus. It seemed, therefore, that this type of germicidal aerosol would probably not be of service in controlling air-borne infections. However, we were subsequently able to demonstrate that the smokes had a considerable lethal effect on the normal flora of atomised saliva and this we take to indicate that they would also affect pathogens emanating from the oral, nasal and respiratory passages. The percentages of survivors of salivary flora after exposure to five smokes are shown in table II.

It is noteworthy that the salivary organisms showed little resistance to the smokes compared with the broth emulsions of the F coccus, though we had previously found the F coccus to be much the more vulnerable of the two to germicidal aerosols and ultraviolet light. The minimum concentration of smoke to show an effect

* 10% hexyl-resorcinol in propylene-glycol. For the composition of this germicide and our standard technique for air-disinfection experiments see Twort, C. C., Baker, A. H., Finn, S. R. and Powell, E. C. *J. Hyg., Camb.* 1940, **40**, 298.

† A saprophytic white gram-positive micrococcus. See Twort et al. 1940.

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TABLE I—PERCENTAGE OF SURVIVORS OF ATOMISED F COCCI EXPOSED TO SMOKES

Cu. metres of air containing 1 g. of smoke	Cardboard			Tobacco			Cotton-wool			Oak			Yang			Gear-grease		
	5	15 min.	30	5	15 min.	30	5	15 min.	30	5	15 min.	30	5	15 min.	30	5	15 min.	30
10	0	0	0	44	0	0	55	0	0	—	—	—	4	0	0	44	14	0
15	75	0	0	30	0	0	34	0	0	—	—	—	33	0·9	0	—	—	—
30	91	0	0	28·6	1·3	0	37	0·3	0	93	62	1·3	86	36	2	88	83	41
60	91	82	2	—	—	—	76	55	37	83	110	1·9	127	89	1·6	NK	NK	NK
120	NK	NK	NK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NK = No kill.

on the salivary flora was only a tenth the amount required to affect the F coccus. We also found that balsams are effective aerial disinfectants, so that the practice of burning incense during religious ceremonial has a rational basis.

We have adopted the procedure used in our previous experiments on air disinfection of taking the mean percentage of survivors over the whole period of the experiment, and then reducing the results to a standard based on a smoke concentration of 1 g. in 10 cu m. of air. Table III is computed on this plan.

This table shows the remarkable sensitivity of the flora of the saliva to the smokes. With the exception of gear-grease, tobacco appears likely to be least effective in controlling aerial infections. We also examined the possibility that smokes falling on the plates might prevent the growth of organisms but found that media exposed to the smokes for up to 35 min. retained their nutrient qualities unimpaired.

SMOKE CONCENTRATION

The concentrations given in the tables are reckoned from the actual amount of materials ignited, no allowance being made for unburnt carbon, residual ash, or for any portion given off as carbon dioxide or vapour which would, presumably, play no appreciable part in the disinfecting process. But it was, of course, necessary to assess the actual amount of material in the air responsible for the lethal effect on the bacteria; the residues were therefore weighed and estimations were made of the particulate matter in the air under test. It was found that the unburnt residues were from 6%–30% and the particulate matter recovered from the air was from 2%–35% of the crude material heated. Space forbids our discussing the factors responsible for the smallness of the latter figures.

From these estimations it seemed that the concentration of active material as smoke in our test atmospheres was probably only about a quarter of that given in the tables. Presumably, the major portion of the crude material being tested passes into the air as carbon dioxide and vapour.

The smoke obtained from incense has a high lethal effect in low concentrations on salivary organisms. If the concentrations of smoke in the air are truly represented by ¼ of the crude material used, then with 1 g. of smoke in 160 cu. m. of air 95% of the salivary organisms are killed in 5 min., and there is sterility within 15 min.; in a concentration of about 1 part in 500 million of air, 95% are killed in 15 min., and there is sterility within half an hour. Further, at a concentration of 1 in 2500 million there is still evidence of a definite effect on the number of living organisms in the air, there being a 50% kill even in 5 min., while at still lower dilutions some effect may be noted after half an hour of contact.

The origin of incense seems to vary; gum olibanum should, apparently, always be one of the constituents, perhaps mixed with styrax, benzoin and cascarilla bark (*Croton eluteria*) but one theological authority states (1868) that incense used in his day was usually a product of *Pinus norvegicus*. We have so far found toluol to be the best solvent for incense, dissolving approximately 70% of our sample. The toluol-soluble portion leaves only a 6% residue after smouldering on the plate. We expected this portion to give a more active smoke than crude incense, but tested against the flora of the saliva there was no indication that this was so.

TABLE III—MEAN PERCENTAGE OF SURVIVORS DURING 30 MIN. EXPOSURE TO A SMOKE CONCENTRATION OF 1 G. IN 10 CU. M. OF AIR

Smoke	Test organisms			
	S. enterit. (Liverpool)	F coccus	*E. coli*	Saliva A
Cardboard (high conc.)	8·6	5·5	0·04	0·2
,, (medium ,,)	—	—	—	0·6
,, (low ,,)	—	—	—	0·5
Cigarette (air blast)	—	4·9	—	0·7
,, (hot plate)	—	—	—	3·3
Cigar leaf (,, ,,)	—	—	—	4·1
Cotton-wool	—	8·3	—	—
Oak shavings	—	8·4	—	—
Yang ,,	—	5·2	—	0·1
Incense (high conc.)	2·6	—	—	0·3
,, (medium ,,)	—	—	—	0·5
,, (low ,,)	—	—	—	0·4
,, (toluol-soluble)	—	—	—	0·2
Gear-grease	—	14·6	—	—

We have not attempted to investigate the chemical composition or physical characteristics of our smokes, but surmise that the most active bactericidal constituents would be phenols. The composition of the smoke will presumably be influenced by the temperature to which the crude material is subjected, just as the composition of tars varies with the temperature of the retort. For instance, as there is an optimal temperature for the production of a maximum number of carcinogenic units from a given organic crude material, solid, liquid or gas, so it is not unlikely that the maximum number of germicidal units would only be obtained from organic crude materials under specified conditions of heating.

In our tests, where an electric hot plate was utilised for smouldering the materials, we made a practice of allowing the current to pass for 2½ min. only, the maxi-

TABLE II—PERCENTAGE OF SURVIVORS OF THE FLORA OF ATOMISED SALIVA EXPOSED TO SMOKES

Cu. m. of air containing 1 g. of smoke	Cardboard			Cigarette			Cigar			Incense					
										Crude			Toluol sol.		
	5	15 min.	30	5	15 min.	30	5	15 min.	30	5	15 min.	30	5	15 min.	30
10	0·7	0	0	13·8	2·5	0	5·3	3·9	0·5	1·11	0	0	—	—	—
15	0·6	0·3	0	14	4	1·2	38	4·7	0·6	3·2	0	0	—	—	—
30	4·2	1·4	0·3	46	15	9	45	19	4·4	3·9	0	0	—	—	—
40	—	—	—	—	—	—	—	—	—	5	0	0	—	—	—
60	6·7	2·2	0	—	—	—	—	—	—	7·5	1·7	0	1·6	0	0
120	42·2	12·5	1·3	—	—	—	—	—	—	43	5·6	0	—	—	—
300	70·5	10·4	3·1	—	—	—	—	—	—	—	—	—	—	—	—
600	40	45	35	—	—	—	—	—	—	49	38	8	60	45	16·4
1200	—	—	—	—	—	—	—	—	—	—	—	—	52	46	31
3000	—	—	—	—	—	—	—	—	—	69	70	16	73	61	44

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mum temperature reached, as recorded by a pyrometer, being about 300° C.

PERSISTENCE TESTS

Germicidal aerosols—at least, those phenolic germicides we have tested—must persist in particulate form if they are to be active; once molecular dispersion occurs they have little or no lethal effect on the test bacteria in the air. Our colleagues, Finn and Powell, found that a substance which might be expected from a low rate of evaporation in bulk to persist for some time, may, when finely atomised, persist in the form of particles only for a matter of seconds. By examination with the ultra-

TABLE IV—INFLUENCE OF AGE OF MIST AND SIZE OF PARTICLES ON GERMICIDAL ACTIVITY

Germicide	Cu. m. air containing 1 g. smoke	Diam. of particles μ	Age of mist (min.)	Survivors % 5 min.	15 min.	30 min.	Mean
S²NaOH	600	2·6	0	32·7	10	1·9	8·9
			15	16·6	1·2	0·77	7·4
			30	19·1	31·5	0	10·1
R.G.G.	50	4	0	66·6	22·7	17·6	36·9
			15	48	72	100	NK.
			30	49	42	90	NK
Incense smoke	30	?	0	4·1	0·2	0	0·9
			15	15·4	1·5	0	3·4
			30	40·7	1·2	0	8·4

microscope they established that the life of a 2μ-diameter particle of S²NaOH is at least 5000 sec.—or about 50 times longer than that of a similarly sized R.G.G.‡ particle; and we have shown biologically that a mist of the former three hours old is still capable of giving a good kill. Table IV shows a few results with saliva.

We investigated two inorganic substances because we had previously found that solutions of calcium and zinc chloride have a measurable degree of activity in mist form. Magnesium oxide smoke produced by burning magnesium ribbon had no demonstrable effect on the F coccus in concentrations varying from 1 g. in 10 cu. m. to 1 g. in 30 cu. m. of air. Ammonium chloride also gave negative results when atomised or when sublimed.

BIOLOGICAL EXPERIMENTS

We also tried to find out whether smokes would prevent the infection of the lungs of mice by *Salmonella enteritidis* ("Liverpool virus" strain) suspended in the air. We had no organism available sufficiently virulent to kill mice by infection from the air, so we took preliminary cultures from the respiratory passages and then exposed the animals to the "virus", killing them immediately afterwards. Cultures from the mucous membrane of the trachea and from a small piece of the lung were made at once in broth, subcultured on a suitable solid medium, and identified. The commonest organisms in cultures from the respiratory passages of normal animals were streptococci and a non-coliform gram-negative bacillus. Among 30 controls we found the streptococcus eight times in the lung and seventeen times in the trachea, the corresponding numbers for the gram-negative bacillus being seven and twenty. In the experiments with smoke from cardboard, growth of *S. enteritidis* was obtained from nine tracheas and eight lungs of the nine control animals, but only from the lung and trachea of one of six test animals, when the concentration of smoke was 1 g. in 10 cu. m. of air, and one of three animals when the concentration was a third of this. When incense was substituted for the cardboard, growth of the test organism was obtained in two tracheas and three lungs of the three control animals, and one trachea and no lungs of the three test animals, when the concentration of smoke was 1 g. in 30 cu. m. of air—a result more or less similar to that obtained with the cardboard smoke in the same concentration. Thus, whereas the respiratory tracts of all twelve controls became infected, those of nine of the twelve test animals remained uninfected.

‡ R.G.G. is resorcinal 45% in watery glycol 7%. It is comparable with Aeryl.

CONCLUSIONS

Under experimental conditions, exhaled tobacco smoke interfered with the effect of a phenolic germicidal aerosol in a concentration of 1 g. in 680 cu. m. of air on a suspension of *E. coli*.

Smokes produced by smouldering six organic substances were lethal to four bacterial suspensions tested, the flora of a normal saliva being much more sensitive than broth emulsions of three laboratory cultures.

Cardboard and incense were the most satisfactory materials used, there being evidence of some lethal effect of the incense smoke in a concentration of 1 g. in 3000 cu. m. of air after half an hour's contact with the atomised saliva.

In calculating concentrations of smoke no account has been taken of unburnt carbon, ash, or material passing into the air as vapour (presumed inactive as germicidal aerosols). Estimations, by aspiration, of the actual quantity of smoke present in the air under test resulted in the recovery of only about 25 mg. for every 100 mg. of crude incense burnt.

Incense smoke, under our experimental conditions, persists in the particulate form, liquid or solid, for at least half an hour.

Magnesium oxide and ammonium chloride smokes in a concentration of 1 g. in 10 cu. m. of air had no apparent lethal effect on an atomised broth emulsion of a laboratory culture.

Infection of the respiratory apparatus of mice with a bacterial suspension of *S. enteritidis* ("Liverpool virus" strain) was mostly prevented by decontamination of the air with cardboard and incense smokes in a concentration lower than 1 g. in 30 cu. m. of air.

FATAL PELLAGRA IN AN ENGLISH SCHOOLGIRL

BY R. E. HOPE SIMPSON, M.R.C.S.

ON Aug. 5, 1940, a tall girl of thirteen presented herself complaining of a sore mouth and aching legs.

The father, an agricultural labourer, is of low mentality; the mother quick and intelligent, but feckless. There are four siblings, all well, but one, a boy, is mentally defective. None of the family has ever been abroad. The patient had a normal birth and was breast-fed until the age of eight months. She had no significant illnesses apart from whooping-cough and measles. She developed into a tall thin girl of normal intelligence. She had always refused milk, and was fond of white bread and butter of which she ate a great deal. Green vegetables and potatoes were always available to her, but possibly meat was limited by poverty, and meals were irregular and unintelligent.

Early in May, with the first constant sunshine, the girl developed a rash on her arms, legs, face and neck. Later she began to complain to her mother of pains in her legs and weakness making the daily mile walk to school formidable. The rash persisted, and at the end of July she developed a sore mouth. When I saw her on Aug. 5 she had fairly severe stomatitis and gingivitis in which Vincent's organisms abounded. There was dusky erythema of the skin, like exaggerated sunburn, on her face and neck and also extending from the elbows to the fingers and from above the knees to the feet. On the front of the neck there was a little dry exfoliation. The temperature was 101° F. She was sent to bed. Pellagra was not at the time suspected, and the diagnosis of Vincent's stomatitis with an accompanying rash was made. By the 10th she had improved. Temperature was normal and the mouth nearly well, but the rash remained. At this date pellagra was first suspected, and I told the parents to give the child a diet containing fresh milk, lean red meat, tinned salmon, tomatoes, fruit and vegetables. I cannot guarantee that these directions were carried out satisfactorily. The blood-picture was normal apart from a mild polymorphonuclear leucocytosis. On the 14th the mouth and temperature were normal, and the condition of the rash was unchanged. She felt well and begged to be allowed out of bed, but this was refused. Next day she was well and cheerful in the morning, but at 1 P.M. she had a convulsion. I saw her at 1.30 P.M. and her appearance had changed aston-

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ishingly. The eyelids were puffy, the eyes were staring, and the pupils dilated. She was confused but responded to simple requests—e.g., to lie still or to turn over. The face had an uneven distorted puffiness. She said she felt no pain. The rash had become a dusky blue-purple, and the lips also were cyanotic. Innumerable tiny vesicles had appeared on the knees, and some on the elbows and neck, and from these appeared some moist exudation. She was sweating freely. She was immediately transferred to hospital, and had two more convulsions on the way. Soon after reaching hospital she went into status epilepticus and died at 7 P.M. No autopsy was done.

COMMENT

Acute pellagra in an English child is rare enough to cause difficulty in diagnosis. In England pellagra seems to be confined chiefly to elderly mental defectives, in whom it is a chronic disease. In this case, even when pellagra was suspected, the great improvement following simple rest in bed appeared to cast doubt on the diagnosis, but the subsequent course of the disease seems to establish it without doubt.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of laryngology on Nov. 1, Mr. T. B. LAYTON, the president, gave an address on theory and method of

Teaching in Laryngology

He divided medical education into undergraduate, graduate and postgraduate phases. Discussing undergraduate education, he said that the aim was no longer to turn out ready-made general practitioners, because general practice was now as much a specialty as any other branch of the art, with its own problems, knowledge and technique. The final student now had to know so much that his knowledge of how to use it was less than that of those who qualified before the last war; and only a limited number went into general practice, perhaps less than 50%. The aim should be to turn out a well-educated doctor ready to branch off in any direction as inclination or circumstances impelled him. He needed knowledge of man and how to examine him. When a dresserships in the throat and ear department became compulsory throat and ear surgeons had ceased to be a group subservient to other teachers. But he had reason to believe that there were some students being signed up for their final examinations who had never been taught to examine the upper respiratory tract, who had never attempted to put a frontal mirror upon the head and who had merely sat round their teacher peeping over his shoulder at the inside of a mouth and listening to his talk. What would be said of the candidate up for his final examination who did not know how to put a stethoscope into his ears? The throat and ear surgeons and the examiners were jointly to blame for this. To those who were not teaching their students to examine patients he could not speak too severely. Examination of the throat and ear involved coördination of all the segmental nerves, from the third cranial to the sacral, with the visual impulses. One had only to look at a beginner to realise that; and coördination would be learnt by practice and by practice only. Variations of the normal were wider in the upper respiratory tract than in any other part of the body, and the deviations from the normal were more indefinite. Their range could only be learned by examination of a large number of people. He found more joy in feeling that the majority of his firm at the end of three months could recognise a normal larynx than in having shown to all of them a few good cases. But there was also plenty to do in teaching general principles. However excellently these had been expounded to him the student had never absorbed them all and to go over the same ground again from a different angle was the best thing possible for him. Principles might be enunciated in a 6 months' course, but they could not be applied without many years of practice. If the general departments laid down the principles the special departments must introduce the student to their application. He advised throat and ear teachers to concentrate on the study of inflammation and the preventive approach to clinical medicine. No part of the body was more suited to the study of inflammation, especially in the early stages, than the upper respiratory tract. Again, every practising doctor, whatever his branch, should approach clinical medicine from a preventive as well as a therapeutic standpoint, and the upper respiratory tract lent itself to this approach better than any other part of the body. Its anatomical variations and its physiological reactions were more numerous than those of other regions. Its local defences against bacterial invasion could there be studied directly. When this inflammation was physiological and when it had become pathological was a distinction so nice that it could never be made with certainty, and it encouraged those powers of disputation for which their section was notorious. Its study could not be begun too soon. The privilege of deciding whether a student was fit to be let loose upon the great British public was in the hands of a limited number of teachers from the general departments. If teachers in charge of special departments were incapable of examining in parts of the body still dedicated to surgeons in the general departments, then general surgeons were incapable of examining in the parts of the body which they had handed over to the special departments; and these, he pointed out, included the greater part of human anatomy. They had handed over the work, but not the responsibility. This was bad—bad for the special surgeon, bad for the general surgeon, bad for the student and above all bad for the patient. The time had come for special surgeons to take their part in the examination system, and a method for including them had been set out in the report of a conference of the examining bodies which dealt with London students in 1932–35. But they must see to it that they were worthy to take up this important work of examining upon which the lives of the people ultimately depended. After they were settled in their life's work, after all examinations had been passed, and after they had attained to a clinic and arrived at some position in the world, were they experiencing men? The phrase was Walter Bagehot's, who had come into his own again in the last year or so.

ROYAL ACADEMY OF MEDICINE IN IRELAND

Dangers of Rubin's Test

AT a meeting of the section of obstetrics on Oct. 11, with Dr. R. M. CORBET, the president, in the chair, Dr. T. M. HEALY reported the results of 600 Rubin's tests. Using ether anæsthesia and Bonney's apparatus, he had seen no ill effects. He had then used carbon dioxide for the test on a smaller series of patients anæsthetised with nitrous oxide and oxygen. Three of these patients, who were physically normal and whose tubes were patent, had died, two on the table, and one 30 hours afterwards with symptoms of damage to the cerebral cortex. He had not been allowed to carry out post-mortem examinations. He had found that the pressure required was on the average 10 mm. Hg higher with carbon dioxide than with air or oxygen. Discussing the possible causes of death he remarked that while there were many minor surgical procedures there was no such thing as a minor anæsthetic.

Dr. BETHEL SOLOMONS had heard of such isolated fatalities in the Rubin test. He did not think the anæsthetic could be blamed, but suggested the possibility of some form of embolism. It appeared that carbon dioxide might be a direct irritant and he intended to use oxygen in future. Rare cases of peritonitis were reported after the test, one of which had occurred in his practice.—Dr. F. W. DOYLE had had a fatal case under his care. The patient had sterility associated with dyspareunia; she was given spinal anæsthesia, preceded by morphia and hyoscine. The tubes were found to be absolutely blocked, and the uterus was then curetted. The patient suddenly complained of great pain, became cyanosed, collapsed, and died in a short time. No post-mortem examination was permitted. He had used oxygen from a cylinder and a pressure of 200 mm. Hg. He wondered whether it was wise to use a cylinder or whether an ordinary pump should be used instead.—Dr. J. F. CUNNINGHAM said he always preferred

to do Rubin's test without an anæsthetic. The most important thing in doing the test was the technique. Great care should be taken not to injure the cervix. He inserted a very fine catheter which only went into the uterus for about 1¼ in.; if bleeding took place he stopped at once.—Prof. O'DONEL BROWNE said that of several hundred cases of tube-testing he recalled only one fatality, the one already referred to by Dr. Solomons. He had performed the test in that case, and the patient had died from streptococcal peritonitis two days afterwards. Nevertheless, he held that tube-testing could be done in an outpatient department, either for hospital or private patients; no anæsthetic or premedication was required. He did not use a bullet-forceps on the cervix; he passed as little gas as possible through the tubes and never hesitated to allow the pressure to rise to at least 250 mm. Hg. He thought no blame could be attached to the anæsthetic used in Dr. Healy's cases.—Dr. G. C. DOCKERAY had found the two chief causes of air-embolism recorded in the literature to be Rubin's test and artificial pneumothorax.—Dr. R. W. SHAW pointed out that in Rubin's test the blocked tubes and the uterus were often widely dilated; this, might induce shock sufficient to cause death. No patient should ever die from a properly given anæsthetic. In his opinion any kind of premedication with a spinal anæsthetic was a definite risk. If he had to use any kind of premedication he gave a few grains of Nembutal by the mouth.—Dr. EDWARD SOLOMONS referred to a case reported by Pierce in which vaginal insufflation had been done without anæsthesia on a patient who was four months pregnant and who had died.—Dr. A. H. DAVIDSON, master of the Rotunda, had done about a thousand Rubin's tests. If the tubes appeared to be blocked he usually curetted the uterus and did the test again; 60% of the cases in which the tubes appeared to be blocked were not blocked after curettage. He had never seen air-embolism after Rubin's test, though he always went up to a pressure of 250 mm. Hg. As an anæsthetic he always used gas and oxygen.

The PRESIDENT said that in doing Rubin's test he used carbon dioxide as the inflating gas with a manometer attached to the side of a metal box, and if the gas failed to pass through the tubes with a pressure of not more than 200 mm. Hg he curetted the uterus and tried the test again. During the operation the patient was under ether anæsthesia. Of the 5 fatal cases mentioned, air-embolism could not have accounted for those which survived for some time after the initial collapse, and in two of the remaining three cases there was a possibility that shock occurred with imperfect anæsthesia.

New Inventions

APPARATUS FOR TRANSFUSIONS AND INFUSIONS

OVER a period of years attempts have been made to devise a simple apparatus, eliminating the defects of previous forms, for administration of blood and other fluids. This paper describes the final design that has been adopted.

The container (fig. 1) is a graduated glass bottle provided with inner and outer metal screw caps and further sealed with an adhesive band. The glass has been selected to withstand mechanical and thermal strains. Special treatment of the inner surface gives it a "skin" which prevents liberation of alkalis when it is autoclaved in contact with aqueous solutions. The bottle holds just over a litre of fluid, thus allowing ample room for the anticoagulant and for frothing when used for taking blood. The relation of height to diameter has been designed for easy handling. Graduations show the volume of liquid discharged and the volume remaining, both when the bottle is upright and when inverted. A simple rustless metal attachment enables the bottle to be suspended from a hook.

The sealing mechanism is specially designed to maintain sterility. A cotton-wool plug is inconvenient if a bottle is to be transported; a rubber stopper is unsuitable because it is readily displaced during sterilisation and the exposed rim is a dust trap. The metal screw cap has been extensively adopted and covers the "danger area" described by Riddell,[1] but most workers consider it insufficient protection against contamination and add some further seal. Paper, cloth, lint, or cellophane tied on with string, and viscose caps are widely used, but are

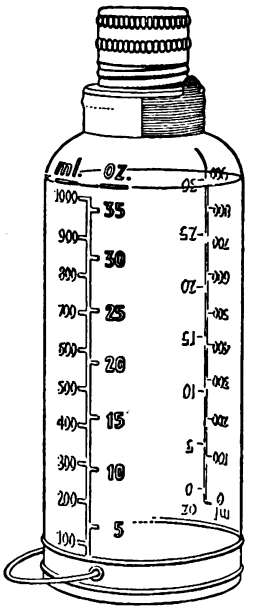

FIG. 1—Sealed container.

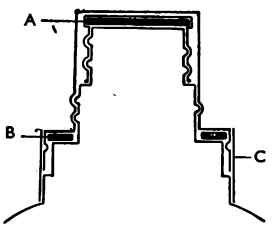

FIG. 2—Sectional diagram showing inner cap and outer cap with their rubber washers, A and B, in position over bottle-neck. C, adhesive sealing band.

apt to prove faulty under unfavourable conditions of temperature, humidity, or handling. To overcome these difficulties it was decided to design a second cap which would entirely cover the first cap. Fig. 2 shows that the bottle-neck carries two distinct screw threads; an inner cap fits the upper smaller thread and acts as a stopper; an outer cap fits over the inner cap and is modelled to engage with the lower and larger glass thread and to retain a rubber washer, B, which acts as a seal by pressing onto a shoulder of glass. The whole of the upper part of the bottle together with the inner cap is thus isolated from possible contamination. To make surer still of preserving sterility the manufacturers supply the bottle sealed with a pliable adhesive band, C, finished

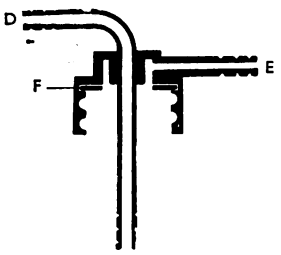

FIG. 3—Apparatus for taking blood.

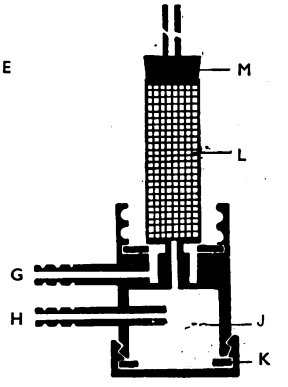

FIG. 4—Apparatus for administering fluids, used with bottle in inverted position.

off with a paper label which serves as an additional seal and as a safeguard against using a bottle which has already been opened. With these precautions the sterility can be accepted as absolute over any period of time if the paper seal is unbroken.

When the contents are required, the paper seal and adhesive band are stripped off, the outer cap is unscrewed, and the inner cap is removed, preferably with sterile gloves. The fluid can be poured for use with the assurance that both it and the glass rim over which it passes are absolutely sterile; or it may be delivered into a vein through the apparatus shown in fig. 4. The bottle may also be used for collecting blood with the aid of the metal attachment shown in fig. 3, which screws onto the upper glass thread. Rubber tubing is used to connect arm D with a needle which is inserted into a vein. Blood passes into the bottle. To accelerate flow, side tube E may be attached to a pump. F is a rubber washer. When the required volume has been collected, the apparatus is unscrewed; the inner cap, which should have been kept

1. Riddell, V. H. (1939) Blood Transfusion, London.

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resting on its flat surface (preferably on a sterile cloth and covered with the outer cap), is replaced and the outer cap screwed over it; ¾ in. adhesive plaster is stretched round the junction of the outer cap and the bottle, and if the bottle is to pass into other hands, a paper seal is added to reveal any subsequent tampering.

Blood or other fluid is conveniently injected intravenously with the metal apparatus shown in fig. 4. The device screws onto the bottle and therefore can never be accidentally displaced, as sometimes happens when a rubber stopper is used. The bottle is inverted, and its contents pass through the side tube, G, while air enters through H. Fluid which has risen in the long vertical air tube is not ejected onto the patient's bed or the floor during the act of inverting the bottle but is trapped in chamber J. Cap K unscrews to facilitate cleaning. When blood is to be dispensed, a filter, L, secured with a rubber bung, M, can be readily slipped into position.

All the apparatus is robust, is easily cleaned, and lasts indefinitely. It can be had from British Drug Houses Ltd.

HERBERT I. COOMBS, M.D.
General Hospital, Birmingham.

UNITED STATES OF AMERICA

CONTROL OF POLIOMYELITIS

IN a pamphlet just issued for distribution to the public by the New York state department of health advice is given in regard to the ætiology, treatment and prevention of poliomyelitis. The public is told that the virus of this disease is thrown off from the body in discharges from the nose, throat and bowels. If the patient is treated at home he must be isolated for two weeks from the date of onset. Children who remain in the household must be quarantined during the same period. Instructions are given for disposing of the discharges from nose, throat and bowels, and include detailed instructions for disinfection of the stools.

PREMARITAL BLOOD TESTS

The first state to require examinations of blood before marriage was Connecticut. During the four years' operation of the law in that state more than 600 cases of syphilis have been discovered in candidates for marriage. The number discovered each year has increased steadily from 81 cases in 1936 to 207 last year. The number of marriages in the same four years has increased from 8278 to 13,782. In 1936 physicians certified that the disease was non-communicable in 46% of cases; in 1939 they granted such certificates in 70%. Reports of congenital syphilis in the state have declined from 38 in 1936 to 11 in 1939.

This year the state of Virginia has adopted a premarital-examination law which is in some respects an improvement over previous legislation. Under this law the clerk of the court may not issue a marriage licence until he has received a statement signed by a physician that an examination has been made including a serological test. This statement, however, does not reveal the results of the examination. If syphilis is found the physician informs both parties of the result and of the possible consequences of marriage. The state department of health is also informed of the result of the examination. Previous statutes in the state of Virginia penalise people who deliberately expose others to venereal disease. It is thus evident that the candidate for marriage who learns of his condition confidentially from his doctor assumes the responsibility of securing treatment adequate to prevent danger to his mate.

CHRISTMAS SEALS.—The N.A.P.T. remind us that the war against tuberculosis still goes on in the midst of other wars, and they ask us to help them by decorating our Christmas letters and parcels with their attractive greeting seals. No mention of tuberculosis is made on the seals, but each carries the double red cross, symbol of the association's work of prevention and cure. The seals cost 4*s.* a sheet and may be obtained from the treasurer of the association, Tavistock House North, London, W.C.1.

Reviews of Books

The Nation's Larder

and the Housewife's Part Therein. Lectures delivered at the Royal Institution by Prof. J. C. DRUMMOND, Sir ROBERT MCCARRISON, Sir JOHN ORR, Sir FREDERICK KEEBLE, Mr. L. H. LAMPITT, D.Sc., Prof. V. H. MOTTRAM and Dr. J. C. SPENCE. With a supplement by Dr. FRANKLIN KIDD. London: G. Bell and Sons. Pp. 146. 2*s.* 6*d.*

IT was an excellent idea of Sir William Bragg's to arrange a series of lectures at the Royal Institution by experts on the different aspects of nutrition and to have them published at a reasonable price. No-one can say that this book is not worth half a crown. In it the feeding of the nation is discussed from historical, medical, agricultural, manufacturing, housewifery and pædiatric points of view. Each lecture, though complete in itself, has considerable bearing on the others. There is considerable repetition but it is all to the good. It helps to drive home the fact that the consumption of the protective foods has decreased, probably will decrease further as the result of war and ought to be augmented. The more often we and our rulers read and hear this the better. The agriculturist maintains with delightful gusto that the climate and soil of Great Britain is the best fitted to grow and produce the protective foods. It is an odd world in which we neglect to grow the foods essential to health and subsidise, at enormous cost to the taxpayer, the growing of foods which we could do without. The book has the blessing of the Minister of Food, but it is no Government-inspired production.

First-Aid Manual of the Irish Red Cross Society

By M. NAUGHTEN, M.D. N.U.I., D.P.H. and J. P. SHANLEY, M.D. N.U.I., D.P.H. Dublin: Browne and Nolan. Pp. 171. 2*s.*

IT is fitting that the Red Cross Society of Eire should have its own first-aid manual; for in the introduction we read that it was the humanitarianism of an Irishman—Marshal McMahon—that helped to found the International Red Cross Organisation at Geneva. For the most part it follows the usual plan of first-aid manuals, but there are certain differences that seem improvements. Methods of placing a person on a stretcher are given in greater detail with simple diagrams, and improvised stretchers are described. Physiology is discussed as well as anatomy. But the chief advance of this book is the way in which it is written. Its simple monosyllabic English, which should be understanded of the people, makes every description clear, and is a pleasure to read. There are a few touches which indicate its origin. In a note on sphagnum, for instance, the student learns that it comes from his own bogs, and he is asked to collect it. And in the glossary he is told whether a word is derived from the Latin or the Greek.

The Case for Family Allowances

By ELEANOR RATHBONE, M.P. Harmondsworth: Penguin Books. Pp. 118. 6*d.*

PENGUIN specials have their own reputation for lucidity; Miss Rathbone adds her gift for vigorous discussion and makes the case for family allowances from wide knowledge and experience. Her arguments need no endorsement here; we have already set them out in the Aylesbury Broadside and we believe, as she does, that they are unanswerable. Children must be fed; and a family allowance of 5*s.* a week for every child, paid to the mother, would go far to ensure health for the coming generation. She reminds us that other countries have made the experiment and in some it has been successfully practised for many years. During a war, with prices rising, the need for this reasonable piece of legislation is greater than ever. Miss Rathbone puts the claim of the mother clearly when she reminds us that mining is rightly considered a dangerous occupation, but that among 600,000 miners the fatal accidents have recently been about 600 per annum or 1 per 1000; among about 650,000 women giving birth to children annually the deaths average 2000, or nearly 3 per 1000; yet the women who undertake this dangerous and essential task are among the unpaid servants of the state.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 9, 1940

AIR IN THE SHELTER

THE purpose of ventilation in shelters, as in any living-room, is to make for safety and for comfort. Even in a crowded shelter the carbon-dioxide concentration is never likely to rise nor the oxygen concentration to fall to an unsafe level unless the room has deliberately been made airtight, and the only real danger from a frowst is the spread of infection. In time this risk may be reduced by germicidal aerosols,[1] or possibly by some development of the work on smokes reported by TWORT and BAKER in this issue, but meanwhile ventilation must be our main defence. Discomfort arises from objectionable smells and from the stagnation of warm moist air around each occupant. The standards of fresh-air supply laid down during the past eighty years have mostly been based on the change of air needed to keep the atmosphere free from perceptible body odours. This varies with the personal cleanliness of the occupants, and fortunately the sense of smell is easily fatigued so that an odour which is at first objectionable soon passes unnoticed. A standard of 6 air changes per hour is often accepted, but for crowded places such as public shelters it is better to reckon in terms of air-supply per person. An ideal standard would be a supply of 1000 cubic feet of fresh air per person per hour, as demanded by the L.C.C. for cinemas and theatres, but in communal shelters the room-space per head is often down to 40 cu. ft. and a standard approaching the ideal would be difficult to achieve without causing draughts in cool weather. For shelters which are mechanically ventilated a supply of 450 cu. ft. per person per hour is recommended.[2] Odours will probably still be present, and with this rate of air-supply it may be impossible to eliminate them completely by ventilation. Various deodorant sprays should be tested and the use of charcoal slabs attached to the ceiling has been suggested by ALSTEAD[3]; in the examples he cited the charcoal was used to prevent the escape of odours from an enclosed space, and though in a shelter the aim would rather be to keep the odours from becoming disagreeable within the enclosure the method might be tried; if it failed to abolish odours it might reduce them. More effective would be a rapid circulation of air through a charcoal filter, but to provide such plants in all shelters would be expensive and take a long time.

In a crowded space the heat engendered by the occupants raises the air temperature considerably unless there is a brisk ventilation, and the unpleasantness is aggravated by stagnation of the air. Air movement is necessary at all times, especially so in a warm atmosphere; but there will be enough movement of the air in most public shelters whose entrances are properly spaced and kept free from obstruction. If the air is very still an electric fan would increase the comfort, or an improvised fan made from a piece of ply-wood might be kept swinging by volunteer punkah-wallahs. In a domestic shelter a vertical chimney-pipe, piercing the roof of the shelter, would help with ventilation provided the door was kept slightly open, especially if any heating appliance used in cold weather stood below the shaft. Chilling however is expected to prove less troublesome than over-heating. In a surface shelter fully occupied, and with ventilation at the rate of 450 cu. ft. per person per hour, the temperature is likely to be in the neighbourhood of 50° F. when the external temperature is at freezing point, while in a basement shelter under similar conditions it will probably be rather higher. A temperature of 50°–55° F. would not be comfortable for people sitting still in light indoor clothing, but it would be no hardship in warm attire. Mountaineering experience would suggest a woolly under a machintosh. If the occupants of a shelter had to sleep on a draughty floor at that temperature there would be good reason for complaint, but with the promised supply of bunks the picture is being changed; in a bunk one can be warmly wrapped, and if necessary screened from draught. The worst floor draughts will pass beneath the lowest bunk, and air currents along the floor can be reduced by screens or baffles at the entrances to the shelter. Should we have a winter as hard as last, some form of heating will surely be called for, anyhow at the beginning of the night. It takes a dogged enough sleeper to ignore noise; it is too much to expect him to ignore cold as well. Sleep comes most readily if hands and feet are warm. While it is unlikely that stoves can be provided in shelters on a large scale, it should at least be practicable to supply the more acrocyanotic inmates with hot-water bottles or to arrange for them to fill their own nearby. Gas-proofing of shelters has been advocated, but if done efficiently ventilation is reduced almost to nil. As soon as a gas alarm was given all opening to the outside air would have to be closed and movements of people in the shelter cut down to a minimum to conserve the oxygen supply. Conditions in a fully occupied gas-proof shelter would soon become intolerable; it would then be necessary for the occupants to put on gas masks and to open doors and ventilators. But the cost of gas-filtration plants for all shelters would be prohibitive; and if the plant was put out of action, or the shelter itself breached, the occupants would be exposed to gas when they were unprepared. It is almost certainly wiser to maintain the ventilation of shelters and let people rely on the protection of their gas-masks.

At present the danger of infection in the shelter is very great. Even a public-spirited person is not going to risk his life to protect his neighbour from a cold in the head; he will go to the shelter with his cold upon him, and let his neighbour take a chance, and so will many who have more serious infections. But a cold, especially in a child, may be the harbinger of serious infection and Mr. MACDONALD'S proposed sick bays in the shelters are likely to be put to the test as soon as they are established. The borough of Finsbury has led the way in a more ambitious scheme for the isolation of infectious patients. Four "health shelters" are being erected, one in each of the densest areas of population in the borough, admission being by tickets obtainable from municipal clinics, health visitors and local doctors. They are designed to

1. *Lancet*, Oct. 12, 1940, p. 455. 2. A.R.P. Handbook No. 5, 1939. 3. *Lancet*, Oct. 26, 1940, p. 532.

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provide shelter for people with infectious and contagious conditions who do not qualify for admission to hospital. These include cases of open tuberculosis, measles, chicken-pox, impetigo and scabies. In the year preceding the war less than half the cases of notifiable disease in the borough were segregated, and in the opinion of Dr. K. W. C. SINCLAIR-LOUTIT, medical officer for civil defence, the position is worse today. The health shelters have been designed with the help of Mr. ORE N. ARUP (who helped to design the penguin pond at the Zoo and whose imagination may therefore be accepted as trustworthy) and are divided into compartments. The care offered to the patients will at least ensure that they are none the worse for their stay in the shelter. More accommodation of the kind would solve the dilemma of conscientious parents of an infectious child, who at present must often have to choose between exposing their own child to bombing and exposing their neighbour's child to infection.

PELLAGRA IN ENGLAND

PELLAGRA, which has existed in all the countries of southern Europe, in Egypt and the United States, has never been endemic here, though no doubt many more cases are diagnosed than are published and many others go unrecognised and unrelieved by specific treatment. Cases in this country may be divided into three groups. First comes the sporadic group, of which Dr. HOPE SIMPSON describes an example in a child on another page. Next are the cases associated with organic disease, more particularly some chronic abdominal condition such as gastric carcinoma, pyloric ulcer that has been short-circuited, rectal stricture or tuberculosis. Lastly there is the institutional group, in which the disease appears in an insidious form among the chronically insane and inmates of homes for the aged and infirm. Cases following in the wake of chronic alcoholism or acute bouts of drinking are common in America but have never been reported in England.

In children, as STANNUS [1] has pointed out, cases of pellagra bear a close resemblance to one another, and only one out of a family living under the same conditions may be attacked. The onset, usually in spring, of an acute dermatitis resembling sunburn on exposed skin surfaces, more severe than is warranted by the strength of the sun's rays, and followed by a persisting dusky red-brown pigmentation and exfoliation should immediately suggest pellagra. The areas mostly affected are the backs of the hands and wrists, the face, as far as the limits set by the hair, and sometimes the neck and eyelids. If the dermatitis is associated with a simple diarrhœa and some change in the mental attitude the diagnosis is almost certain. There may also be glossitis,[2] stomatitis, cheilitis, white sodden excoriations at the angles of the mouth, palpebral fissures and nostrils, pharyngitis, gastritis, proctitis, and a sodden condition at the free margin of the prepuce with urethritis, or a similar condition of the perineum and vulva with vaginitis. The nervous signs may include increased knee-jerks, muscular weakness with spasticity, ataxic incoördination and jerky tremor, so that the child may be unable to stand or walk, or even sit up in bed and feed himself. The symptoms vary from day to day and improvement often follows simple rest in bed. The attack may pass, or the patient may take a sudden turn for the worse and die, a sequence of events well illustrated in Dr. SIMPSON'S case.

Adults may present a similar acute picture or the disease may evolve slowly and insidiously. The skin changes may amount to no more than a roughening of the backs of the hands and wrists, like chapping, with some hyperkeratosis over the knuckles and a lilac pigmentation. The patient complains of a sore tongue hypersensitive to hot, salt or spiced foods; the mucous membrane of the mouth and gums may be a fiery red, the tongue red and inflamed along the sides and tip with coated dorsum and variegated areas of denudation. Anorexia, indigestion and burning sensations in the stomach are common and at this stage constipation is a feature, sometimes interrupted by bouts of diarrhœa. Mental changes may predominate and are often put down to neurasthenia or neurosis; they may include undue fatigue, insomnia, irritability, headache, vertigo, palpitation, numbness and burning sensations, loss of memory, disorientation, anxiety and apprehension, hyperemotionalism, distractibility and confusion. Later, changes comparable to the psychoses may be seen—mania, depression, delusions, persecuted states and dementia. Laboratory investigations may demonstrate hypochlorhydria, achlorhydria or achylia, and a hypochromic anæmia with negative stools. The symptoms vary in degree and time of appearance, and the alliterative tag of the textbooks, dermatitis, diarrhœa and dementia, may mislead the practitioner unfamiliar with the disease.

In our last issue LESLIE HARRIS criticised those who are satisfied with a minimum instead of an optimum diet, with one that will prevent well-defined clinical symptoms of deficiency rather than one that will promote fullest health. What he says in regard to vitamins A, B and C may well be true of the factors involved in pellagra. In the epidemic areas of the United States it has long been recognised that patients without the fully developed picture constitute a majority of pellagrins, and FIELD, PARNALL and ROBINSON [3] describe some of the skin lesions of pellagrous origin which may easily be overlooked: hyperkeratosis, accompanied by light yellow to dusky brown or even black pigmentation over pressure points, such as the knee, instep, elbow and knuckles, or on the soles of the feet and palms of the hands; ichthyosis-like changes on the antero-lateral aspects of the legs, or an appearance as if the leg has been painted with varnish which has cracked mozaic-fashion. Further observation in this country may show that some of these conditions, which have been called subclinical pellagra, are not uncommon.

Nicotinic acid was hailed by many as the pellagra-preventing vitamin and the disease was defined as a deficiency of nicotinic acid, but this view had soon to be modified in favour of a deficiency of several vitamins. SPIES [4] suggests that there are three clear-cut syndromes to be distinguished in the disease—first, a deficiency of nicotinic acid, giving rise to the dermatitis, glossitis, stomatitis, gastro-intestinal and mental

1. Stannus, H. S. *Brit. med. J.* 1939, **1**, 250.
2. The tongue in pellagra was illustrated in Dr. Manson-Bahr's paper in the *Lancet* of Sept. 14, 1940, p. 322.
3. Field, H. Jr., Parnall, C. Jr. and Robinson, W. D. *New Engl. J. Med.* Aug. 29, 1940, p. 307.
4. Spies, T. D., Vilter, R. W. and Ashe, W. F. *J. Amer. med. Ass.* 1939, **113**, 931.

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symptoms, and the affections of the vulva and perineum; secondly, a deficiency of riboflavin responsible for the red, shiny lips, the excoriations at the angles of the mouth, eyes and nostrils, and the seborrhœic skin with fine, scaly, greasy desquamation and comedo formation about the naso-labial folds, bridge of the nose and forehead; thirdly, a deficiency of thiamin (vitamin B_1) causing the neuritic signs. This view is supported by the fact that some of the symptoms in these three syndromes may be found in other conditions.

The recent experience of KING[5] in the treatment of patients with Vincent's infection of the mouth and gums suggests that they were suffering from a deficiency of nicotinic acid. The idea of clear-cut syndromes due to specific vitamin deficiencies may need modification as further knowledge accumulates, for interference with one vitamin may disturb the action of others in the general metabolism.

The treatment of pellagra is always urgent. Hospital supervision and careful nursing are essential. Nicotinic acid, or better its amide which is less likely to provoke uncomfortable reactions, is the sheet-anchor in therapy, given in doses of 100–500 mg. or even 1000 mg. daily by mouth. For the first week it should always be given in divided doses, the smaller quantity in five doses of 20 mg., the larger in ten doses of 50 mg. each, spread out through the day. If vomiting precludes oral administration intramuscular or intravenous injection may be necessary. The lesions of the mucous membranes are the first to respond, often in a remarkable way within 48 hours, and very soon the patient no longer feels ill, diarrhœa ceases or constipation is relieved, the mental changes pass and the rash disappears. When these symptoms have improved it is time enough to deal with riboflavin and thiamin deficiencies and to supplement the nicotinic acid with riboflavin in doses of 1–5 mg. by mouth for three days followed by 0·025 mg. per kg. of body-weight daily, and with thiamin hydrochloride, 10 mg. twice daily, intramuscularly. Cessation of nicotinic-acid treatment may often be followed by relapse, and it is essential to give a maintenance dose of the drug, often for many weeks, until the patient is able to take a full diet containing ample protein and an "optimum" content of vitamins.

CHEMOTHERAPY OF WAR WOUNDS

IN the five years that have elapsed since chemotherapy was introduced, clinical investigation has tended to lag behind laboratory research. Many new compounds of the sulphonamide group have been synthesised and tested on laboratory animals. But the reports of clinicians have mostly been uncritical or have compared a series treated by the new methods with former series, rather than with patients taken at random from the group and treated without chemotherapy. The war has provided abundant material for large-scale observations on human beings, among whom sets of wounds or burns might be found almost as uniform in conditions of seed and soil as a group of experimental infections in mice. But though such observations have been planned they have not as yet produced a body of evidence from which firm conclusions can be drawn.

5. King, J. D. *Lancet*, July 13, 1940, p. 32.

The opening speakers in the discussion at the Medical Society of London on Oct. 28 were careful to point out that any estimate of the place of chemotherapy in war surgery must as yet depend on impressions rather than figures, and that in judging such impressions allowance must be made for the many variables which may affect the result no less than for the drug employed. Colonel MAX PAGE told how the plans which he and Colonel L. COLEBROOK had formulated for controlled experiments in chemotherapy in the units of the B.E.F. in France had been frustrated by the paucity of material in the early stages of the war and the harassed conditions that followed. He quoted a series of about 20 abdominal wounds operated on by Major SAMPSON HANDLEY and given sulphanilamide, and a smaller series of flesh wounds excised and sutured after local application of sulphanilamide powder. Both series had done so remarkably well that he thought credit must be given to the drug even after allowance had been made for good surgery and favourable conditions. In established infections and in septicæmia he had not found chemotherapy effective, but one of its most important applications was in minimising the risk of secondary operations in infected wounds. Mr. W. H. OGILVIE discussed a batch of about 200 wounded from Dunkirk and the fighting that preceded it, who were received at Dartford from three to six days after being hit: some had chemoprophylaxis in transit, others had not, but all were given sulphanilamide on arrival and after operation. He considered that the cases who had prophylaxis arrived in better condition than those who had not, while the progress of late and infected wounds given sulphanilamide after drainage and immobilisation in plaster compared favourably with that of the wounded in the Spanish war who had no chemotherapy. Colonel COLEBROOK stressed the need for careful investigation and recording while conditions allowed the collections of exact records. He pointed out that though streptococcal wound infections could be cut short by early chemotherapy the majority of such infections in war are not primary but hospital contaminations; the time when they appear is uncertain and prophylaxis is therefore difficult, but would be helped by frequent bacteriological analysis of all wounds. He reminded his hearers that streptococcal epidemics were liable to sweep the wards of any hospital treating wounded and that they would become more common as the war progressed. Chemotherapy for the first time enabled us to fight such epidemics at their onset. He also pointed out that, apart from cases showing constitutional evidence of streptococcal infection, many instances of unsatisfactory wound progress and delayed healing might be explained by such an infection. In one hospital, where a number of grafting operations on burns and road accidents had unaccountably failed, he found that the apparently clean wounds were infected with hæmolytic streptococci; after treatment for two or three days with sulphanilamide powder the contamination disappeared and subsequent grafts were successful. In gas gangrene the evidence was not as yet convincing, but he considered that a sulphanilamide pack giving maximum concentration of the drug in the immediate neighbourhood of the infected surface was sound treatment. Prof. A. FLEMING entered a protest against the tendency to

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label sulphanilamide as antistreptococcal, sulphapyridine as antipneumococcal, and sulphathiazole as antistaphylococcal, whereas they acted on the streptococcus in that order of potency.

The plea for controlled experiment is a timely one. For chemotherapy is still in rapid advance; it is being extended to new fields such as infections by streptothrix and clostridium, while new compounds are constantly arriving, some backed by reliable research, others depending for their popularity on their colour, their freedom from unpleasant effects or merely the advocacy of their makers, some active, others so poorly absorbed from the alimentary canal that they rarely reach a therapeutic concentration in the blood.

Annotations

THE QUEEN WAS IN THE PARLOUR

IT is common to liken the behaviour of man to that of the bee, but the two creatures differ in a number of important particulars, especially in their family life. A colony of bees, for instance, contains a few thousand workers, a few hundred males and only one queen, a properly developed female whose sole function, like that of women in some human social systems, is the propagation of the species. The queen bee, however, surpasses her human sister, for she may in a season become the mother of a quarter of a million bees, and in a single day may lay more than her own weight in eggs. The worker bees, sexually undeveloped females, have no time for that sort of thing. Their minds are on their work. Human sociologists observe with interest that the startling difference between the queen and the workers is not inborn, but is dependent on infant feeding. All female larvæ are fed for two or three days after hatching on royal jelly, a thick milky substance generally believed to be secreted by the pharyngeal glands of the nurse bees or young workers. During these days, their anatomical development is equal. Thereafter only the queen is allowed this special diet, on which she is fed for the rest of her life. She develops into a sexually mature female, her less favoured sisters, fed on honey and pollen, becoming workers. The nature of this remarkable food has been the subject of much speculation, and a number of analyses have been carried out. It was thought at one time that its sex-differentiating properties might be due to vitamin E, but several workers have disproved this supposition. It contains no vitamin A, little or no C, but definite quantities of B_1. Recently Heyl[1] produced evidence that it contained a gonadotrophic hormone, a suggestion which is upheld by the investigations of Townsend and Lucas,[2] who produced from royal jelly four fractions. The first, an ether-soluble material, consisted of an organic acid with smaller amounts of phenols, beeswax, sterol, phospholipin and a saponifiable substance. The second, ether-insoluble, water-soluble and dialysable, was chiefly sugar with an unidentified acid, inorganic salts and nitrogen compounds. The third, ether-insoluble, water-soluble, non-dialysable, is a mixture of proteins, as also is the fourth, which is water-insoluble. There is some evidence that the remarkable sexual effects are due to the ether-soluble fraction, which, when added to the diet of the fruit fly (*Drosophila*) produces early maturity and increases by 60% the output of eggs. It is idle, and therefore pleasant, to speculate on the results of this painstaking and at first sight rather thankless labour. The final isolation of the active principle of royal jelly is likely to be followed by its synthetic production. It may become available then not only for the members of the apian depressed classes, all of whom will become queens, but for experimental work in other fields. The thought of the family Wyandottes laying more than their own weight of eggs in a day cannot be entertained without emotion.

1. *Science*, 1939, **89**, 540.
2. Townsend, G. F. and Lucas, C. C. *Biochem. J.* September, 1940, p. 1155.

A NEW MALARIA PARASITE?

To name a new species of malaria parasite without exhaustive and critical survey of the evidence is always a little dangerous because names are apt to stick and can only be eradicated with difficulty if they later turn out to have been bestowed mistakenly. A new plasmodial candidate for recognition has lately been seen in Nairobi by Roberts.[1] Cases of infection with the parasite were first found by Dr. D. B. Wilson in two African patients in Tanganyika, and slides were demonstrated to the Royal Society of Tropical Medicine. Dr. Roberts's first case was in a European, but several subsequent cases were in Abyssinians. Later, during the current malaria epidemic, cases were found among all races. Clinically, the main features were frequent relapses in spite of intensive treatment, and the extremely heavy infection of the blood found in each attack, accompanied by moderately severe anæmia. The pyrexia only lasted 24–48 hours. The parasites were of the quartan type and found in enlarged red cells. Owing to their uncommon appearance and their diversity they were at first taken for a quadruple infection. Small forms were compact with well-defined nucleus and vacuole, resembling *Plasmodium ovale* and multiple parasites—sometimes as many as four—were often seen in the same corpuscle; few of them seemed to be amœboid. Larger parasites were also compact with a well-defined vacuole; some with a fragmented appearance appeared to be amœboid. Gametes were pale with well-distributed pigment; little cell margin remained round the parasite when full grown, but what there was usually showed traces of stippling. The average number of merozoites ranged from 10 to 12. The parasites were easily identified by their profusion and the large size of the gametes. The older forms somewhat resembled *P. malariæ*, but the typical band-forms were not found and the red cells were never the same as in quartan. The possibility of a double or multiple infection must be borne in mind; scientific proof of a new species can only be obtained by inoculation of a non-infected subject and reproduction of the disease with parasites in the blood. Should further research establish this as a new species of the human plasmodium, the name *P. wilsoni* which has been suggested would be appropriate.

CARDIOVASCULAR SYPHILIS

THE rapidly diminishing incidence of aneurysm of the aorta distracts attention from the still unnecessarily high incidence of cardiovascular syphilis. Gone are the days when signs and symptoms were clear-cut; preventive medicine has changed all that. No longer does the stream of pulsating aortic aneurysms, agonising lightning pains, and huge hob-nail livers provide the clinician with a never-ending flow of perfect "teaching cases." We now must concentrate upon the early signs of disease, and nowhere more than in the detection and treatment of cardiovascular syphilis. As Blumgart[2] points out, this condition is responsible for more adult deaths than neurosyphilis and is responsible for 10–15% of all cardiovascular disease. No good clinical or pathological evidence has ever been produced to support Warthin's opinion as to the high incidence of syphilitic myocarditis. Apart from certain cases of heart-block, the *Treponema pallidum* affects the heart indirectly through its action on the aorta. The symptoms and signs of uncomplicated

1. Roberts, J. I. *E. Afr. med. J.* September, 1940, p. 212.
2. Blumgart, H. L. *New Engl. J. Med.* Sept. 19, 1940, p. 443.

syphilitic aortitis quoted by Blumgart are generally accepted, including radiological evidence of aortic dilatation, a tympanitic, bell-like accentuation of the aortic second sound, a history of circulatory embarrassment, increased retrosternal dullness, progressive cardiac failure, substernal pain, paroxysmal dyspnœa, systolic aortic murmur and increased pulsation in the suprasternal notch. Moore and his colleagues [3] contend that the presence of 3 or more of the first 7 of these signs or symptoms in a syphilitic patient under the age of 50 is strong evidence in favour of the diagnosis of syphilitic aortitis. It is well to remember that efficient early treatment of syphilis would reduce the incidence of cardiovascular syphilis to a very low figure, that 20–30% of patients with syphilitic aortitis have a negative serologic reaction, and that routine screening of the heart and aorta is essential if syphilitic aortitis is to be detected early. To postpone diagnosis of early aneurysm until the patient presents some or all of the classical symptoms or signs is, according to modern standards, verging on malpraxis; if routine radiology was employed in all cases it would not be long before aneurysm of the aorta became a genuine museum piece. Early diagnosis of aortic incompetence is equally important. Corrigan's pulse and pallor of the facies should be relegated to the textbooks of the history of medicine; aortic regurgitation must be diagnosed at the stage when only the typical diastolic whiff can be heard to the left of the sternum in the third or fourth intercostal space. Once definite signs of cardiovascular disease have appeared, the organic arsenical preparations are contra-indicated. Treatment must be restricted to the signs of congestive failure. In earlier cases a course of iodides and mercury may be given by mouth and in the absence of untoward developments a course of intramuscular bismuth may be alternated subsequently with the oral administration of iodides and mercury. If the diagnosis is made very early indeed small and carefully controlled doses of the organic arsenicals may possibly be given following a course of intramuscular bismuth, but on the whole it is probably wiser to restrict the arsenicals to the early stages of the infection when their use in adequate dosage is not only safe but imperative. Absolute contra-indications to their use are the presence of angina pectoris, well-marked aortic incompetence, or congestive heart failure.

THE INFANT AFTER CÆSAREAN SECTION

REPORTS on the fate, immediate and remote, of infants delivered by cæsarean section have appeared in many countries, but Olof Brandberg considers that Swedish experiences are still worth recording.[4] The material available comprised 367 cases over a period of approximately twenty years; of the whole group 292 were delivered by classical cæsarean section and 75 by the vaginal operation. Boys and girls were equally represented in both groups. The gross infantile mortality was 10% for the classical operation and 66% for the vaginal operation, but as Brandberg points out such gross figures give an unfair representation of the position, for in many instances, especially when the vaginal route was employed, the main, if not the sole consideration, was the life of the mother. Many if not all the deaths could be "attributed," if that is not too strong a word, to the operation, since of the 30 deaths following the classical operation 22 are classified as stillborn or dying within two hours of delivery. Prematurity also has to be taken into consideration, for 78 of the 367 infants had a birth-weight below 2500 g. and were therefore classified as immature. The gross mortality among these infants (including both operative routes) was 66·7%, compared with 9·3% among the full-time infants. This compares not unfavourably with figures which put the total mortality of premature infants during the first year of life between 45 and 60%. The indications for the cæsarean operation are considered by Brandberg in some detail and it is clear that when there is some easily ascertained mechanical indication such as contracted pelvis, when the operation can be deliberately planned beforehand, the risks for the infant are extremely small. Thus 115 mothers in the series had the classical operation for this reason and there was no infantile death. On the other hand, with emergencies such as placenta prævia and eclampsia, in which the mother's life is seriously in danger, the infantile mortality is higher. The Swedish figures show in placenta prævia 9 infant deaths in 58 cases of the classical operation and 11 in 75 cases of the vaginal operation. For eclampsia the corresponding figures are 1 death in 21 (classical) and 30 deaths in 75 (vaginal). Brandberg has also studied the weight curve of surviving infants and confirms a common experience that small infants are slow in regaining their birth-weight. Various theories to explain this are considered but all are rejected and it remains a minor mystery. Of greater importance are the results of a follow-up over a long period. Of the 288 children who survived Brandberg was able to obtain information about 234, and to secure a medical examination, either by himself or a local practitioner, in 148. The particular object was to check the possibility of disorders of the nervous system. In 10 cases of the 234 there was a greater or less degree of mental defect, and 4 of these, all delivered by the classical operation, had symptoms of intracranial trouble. It is not, of course, claimed that all such children owe their neurological or psychological complaints to the method of delivery. Brandberg gives details of infants in whom definite intracranial trauma was found. In one instance, the classical operation having been performed for placenta prævia, the infant, weighing only 2400 g., died and was found to have a ruptured tentorium cerebelli with supratentorial hæmorrhage. Thus the cæsarean operation does not guarantee an uninjured infant, and in general the prognosis of infants delivered by classical cæsarean section in Sweden seems to be very similar to that for infants in general.

SUCCESS IN SKIN GRAFTING

Thiersch grafting may be the most gratifying or most perplexing form of treatment; complete success may alternate with complete failure. Szutu and Chen [1] have recorded their experiences, and increasing confidence with Thiersch grafting has led to the gradual replacement of pinch grafting at their hospital. Nothing less than 95% take is considered good, and in 53 cases they claim 65% good takes in primary, and 80% good takes in secondary grafting. This latter figure is particularly remarkable, being higher than that of primary grafting. Rank [2] has analysed 629 grafts from the L.C.C. plastic surgery unit. He classifies these into complete takes, those over and those under 75%, and complete failures. Inlay grafts (94) were invariably successful; primary grafts showed more than 75% take in 83% of cases, but secondary grafts showed more than 75% take in only 41% of cases.

Several factors play a part in successful grafting. The surgeon must be capable of cutting a graft of uniform thickness, not too thin and not too thick, in one piece sufficiently big to cover the defect; this comes only with practice with a good razor and a flat surface. The second problem is the preparation of the recipient area; Szutu and Chen have not found this troublesome, and do not refer to it in their communication, although they recognise bacterial infection and impoverished blood-supply as causes of failure in 4 cases of poor take. Rank

3. Moore, J. E., Danglade, J. H. and Reisinger, J. C. (1932) *Arch. intern. Med.* 49, 753.
4. *Acta pædiatr.* June 30, 1940, p. 403.

1. Szutu, C. and Chen C. Y. *Chin. med. J.* June, 1940, p. 535.
2. Rank B. K. *Brit. med. J.* 1940, 1, 846.

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considers that mixed infections of staphylococci, streptococci, *B. pyocyaneus* and *B. proteus* are particularly inimical; it is to be hoped that much will be learned from studies of the many denuded surfaces to be seen today. Cross-infection in an open ward and the difficulty of dislodging an infection once established are the chief anxieties. Whether the granulations are left, or removed by knife or curette seems to make little difference, though Brown, Byars and Blair [3] think they should be sliced off. The method of dressing is important; all agree that a pressure dressing is essential, and many ingenious devices have been tried in an attempt to get even pressure of the requisite degree. Szutu and Chen attribute a large part of their success to their "collodion-gauze" technique. The graft is perforated in many places, placed on the raw surface, and covered by a single layer of gauze, cut large enough to overlap the surrounding skin for about 2 cm. It is stretched and sealed around the edges with collodion. Further layers of gauze, cut the size of the grafted area, are applied to make a dressing about 0·5 cm. thick. This is pressed into place, to remove all bubbles under the graft, and bound with short narrow strips of flamed adhesive plaster. In all cases the first dressing is done the next day. The gauze compress is removed, but the final layer of gauze is not disturbed unless the graft is found to have slipped, or exudate has collected beneath it. The exudate is allowed to escape by making further incisions in the graft with fine scissors. If no moisture is present a dressing similar to the first is applied, otherwise irrigations and compresses are used frequently, always leaving the first layer of gauze undisturbed. It may well be that the secret of success lies in this early inspection of the wound. In this country the tendency has been to leave the first dressing for 5–7 days for fear of disturbing the graft in its early unstable state, but this risk is probably less than the risk of allowing fluid to lift the graft from its bed.

A high proportion of Szutu and Chen's cases were for defects following mastectomy for breast cancer; in such cases infection should be minimal. Unhealed post-traumatic wounds and unhealed burns are much more likely to be heavily infected and give correspondingly worse results.

SMOKE AS AN AERIAL DISINFECTANT

CURERS of kippers and hams will not need telling that smoke has bactericidal properties, and there are many smokers who maintain that their pipe keeps away not only flies but colds also. On another page Dr. Twort and Mr. Baker have put this vague knowledge on a firmer basis by a preliminary report on their investigations into the effect of smokes from such diverse sources as cardboard, tobacco, wood-shavings and incense on bacteria suspended in the air. This work arose from an inquiry into the influence of particulate matter in the air on the efficiency of germicidal aerosols, when it was found that the smoke from burning cardboard dipped in potassium nitrate itself destroyed bacteria atomised in the air. Additional tests showed that incense gave the best "kills," and that the bacteria in normal saliva were more susceptible than a coliform bacillus or a saprophytic gram-positive coccus. If respiratory pathogens turn out to be equally susceptible smokes may help to solve the present urgent problems of preventing respiratory cross-infection. They would have the enormous advantage over an atomised liquid that a very simple and cheap apparatus would be sufficient for their generation. It should, for example, be easy to arrange an automatic device which would burn the requisite amount of incense at regular intervals. It is a strange turn of the wheel which has revealed antiseptic properties in the odour of sanctity. Fortunately or not, the smoker is not to be allowed to puff with pride, for tobacco smoke comes low down on the list as a disinfectant, and smoke exhaled is deprived of its germicidal properties.

3. Brown, J. B., Byars, L. T. and Blair, V. P. *Surg. Gynec. Obstet.* 1936, **63**, 331.

MAX CLOËTTA

THE death in the early summer of Professor Cloëtta at the age of 72 broke a remarkable academic sequence, for his father held the chair of materia medica and his grandfather was the first professor of surgery in the newly founded University of Zürich. Max Cloëtta after some early contacts in Strasbourg and Paris spent his life in Zürich, where in 1901 he succeeded Golls in the chair of pharmacology. As director of the Institute of Pharmacology he had the collaboration of such men as Hans Fischer and H. W. Maier. He will be remembered as one of the earliest exponents of the science of experimental pharmacology; his fundamental work on the digitalis glycosides would alone suffice to secure for him a place in the niche of fame. As a researcher he had an uncanny faculty of discerning the significant part of the work of others; his insight into the action of the several components of digitalis, for instance, was based on a critical appreciation of Schmiedeberg's classical treatise. His own survey forms a link between Schmiedeberg and the recent work of J. A. Jacobs, A. Stoll, and Windaus. But Cloëtta was no narrow specialist; the breadth of his knowledge, gained from first-hand experience, is well seen in the *Archiv für experimentelle Pathologie*, to which he contributed important papers on morphine, arsenic, and antimony. It was on his invitation, when dean of the medical school, that Sauerbruch accepted for a short period the university chair of surgery, and Sauerbruch's operative skill allowed Cloëtta to explore a number of physiological problems bearing upon human pathology. These investigations advanced the practice of intrathoracic surgery, and soon afterwards he published a paper on the pathology and therapeutics of bronchial asthma. In later years Cloëtta pitted his intellect against the elusive problem of sleep. This mystery he left unsolved, but his researches bear the unmistakable signs of the master.

Prof. D. L. SAVORY has been returned unopposed as Unionist member for Queen's University, Belfast, in the British House of Commons in succession to Prof. Thomas Sinclair, F.R.C.S., who has retired. Professor Savory has held the chair of French language and Romance philology in the university since 1909.

Mr. W. G. SPENCER, vice-president and consulting surgeon of the Westminster Hospital, died there on Oct. 29 at the age of 83. He had occupied his retirement with writing a history of the hospital from 1719 to 1923.

The fourth list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £8400.

In a circular to borough councils on medical supervision at public air-raid shelters the Minister of Health states that he considers it necessary that public shelters should be regularly inspected by a medical officer of health and that the services of a general practitioner should be readily available during the night for attendance at the shelters. A doctor should make a nightly visit to the larger shelters and at some it may be desirable for a doctor to be present throughout the night. The scale of payment will be 10*s.* 6*d.* for a visit of not more than half an hour when not more than two patients are seen; a guinea for a visit of not more than an hour; and £1 11*s.* 6*d.* for one of not more than two hours. A doctor who visits a shelter and remains on call during the night will receive a guinea. A doctor who is on duty in a shelter during the whole night will receive a salary at the rate of £500 per annum.

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Special Articles

C.E.P.

BY G. B. SHIRLAW, L.R.C.P.E.
ASSISTANT MEDICAL OFFICER (A.R.P.) FOR BATTERSEA

MANY months before the outbreak of war Crome, Fisher and I [1] suggested that the Government scheme for the evacuation of air-raid casualties from the danger zone relied too much on the existing hospitals. These hospitals are in some cases old and vulnerable, and we felt that others might easily become targets; their many windows would expose patients to flying glass, they were often badly placed for transport and unsuitably laid out for casualty-clearance work, and they offered poor protection to surgeons, theatre staff and equipment. These forebodings have proved well-founded and it seems opportune to revive again the plan, outlined then and recently recalled in THE LANCET,[2] for the provision of classification and evacuation posts (C.E.P.).

USE OF BASEMENTS

It is clearly foolish to transfer a patient from the scene of one injury to a building where he is exposed to the danger of a second. Bomb-proof hospitals cannot be built in London at this stage, and the most sensible course would be to transfer patients to hospitals in centres less liable to constant aerial attack. Not all patients, however, need or are in a fit state to be transferred immediately; some require treatment for shock, others immediate operation, and some, after attention, would be fit to go home. Centres are therefore needed where patients can first be classified and then treated or evacuated according to their condition. To classify them is probably the most skilled task of all.

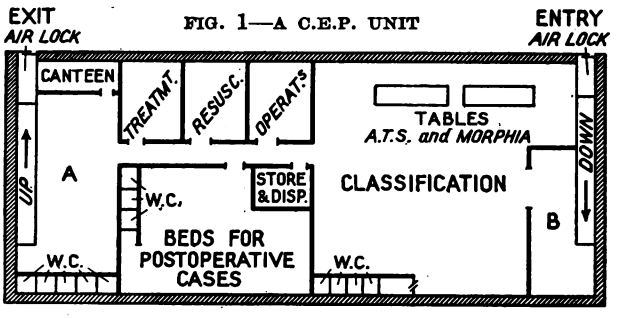
Our original suggestion still seems to me sound: that centres should be set up in basements under the stronger buildings of London (or of any other town exposed to frequent attack). The buildings chosen should be steel-framed hotels, warehouses, office buildings, blocks of flats or similar structures—of which there are plenty—chosen because they are strategically placed near main roads which would be difficult to obstruct, or railway or underground stations. They should be properly warmed and lighted. To convert these basements for the purposes required would be relatively simple, not very costly and so useful that the advantages would easily overtop the drawbacks.

1. Crome, L., Fisher, R. E. W. and Shirlaw, G. B. *Lancet*, 1939, 1, 655.
2. *Lancet*, Oct. 5, 1940, p. 423.

LAY-OUT OF A C.E.P.

The space in such a basement would be apportioned in a way recalling the component parts of a modern casualty-clearing station. The most important part of the centre would be the space reserved for the classification of casualties (fig. 1). Its size should vary directly with the density of population in the area feeding the C.E.P. and inversely with the shelter accommodation provided. Keeping the clearance rate in mind, it must be large enough to admit all casualties which may occur

FIG. 1—A C.E.P. UNIT

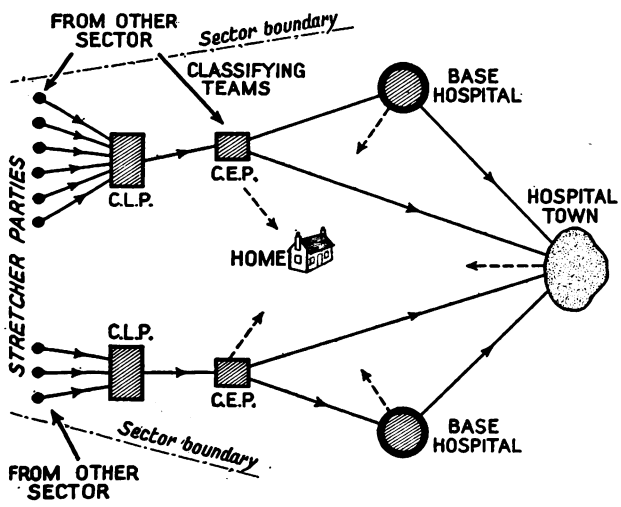


A.T.S. = antitetanic serum. DISP. = dispensary. (A) Evacuation section with clerk, stretcher bearers and social workers. (B) Admission section with clerk, stretcher bearers and blanket dump.

in the district. The second department includes operating rooms for surgical teams and ward space for those who have undergone or are awaiting operation; the size of this department depends on the size of the classification department and thus on the population of the district. The numbers requiring immediate operation are not likely to be great, but patients cannot be transferred immediately afterwards, so that beds must be provided on a scale which allows for accumulation over a period of days. A third department will have beds for patients requiring resuscitation. Minor casualties will be treated in the fourth department and allowed to rest before being sent home; this department corresponds to the existing first-aid posts, but with the difference that it is housed in safe surroundings. The fifth department, from which evacuation of casualties is carried out, must be roomy enough to allow the patients to wait in comfort and the surgical teams to

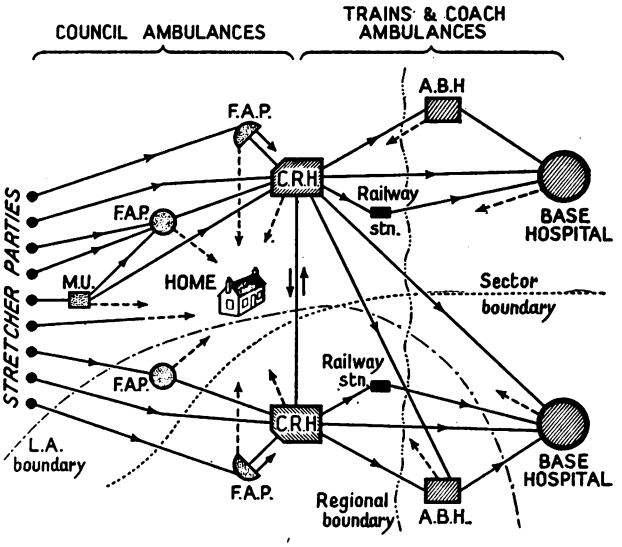
FIG. 2—DISPOSAL OF CASUALTIES

(I) Proposed system



C.L.P. = casualty loading point. C.E.P. = classification-evacuation point. M.U. = mobile unit.

(II) Present system



F.A.P. = first-aid post. C.R.H. = casualty reception hospital. A.B.H. = advanced base hospital. L.A. = local authority.

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give any attention necessary before the patient is transferred. It should have a well-stocked canteen. If possible it would be well to have additional access to this department from the classification department, either directly, if the shape of the basement allowed it, or by way of a second corridor past the central block, so that traffic in the corridor outside the operating-theatres would be reduced and the patients in the ward would be less disturbed by noise. The ideal C.E.P. would combine all these departments in one building. Hospitals which are sufficiently strong and well placed should naturally be considered first, but if they cannot offer sufficient accommodation—and usually they cannot—it must be sought elsewhere, the sooner the better. There will undoubtedly be some areas where no suitable basements can be found to house the whole C.E.P. In such a case it might be necessary to split the centre into its component departments; each department could be placed in a separate building or several might be in one building and the rest in basements close at hand. Adequate space for classification is the crux of the whole problem.

SKILLED CLASSIFICATION

The work of classification is so important that it must be in the hands of a first-class and highly experienced surgeon. Patients can be classified as (1) for immediate operation; (2) for immediate resuscitation; (3) for evacuation; (4) for dressing and discharge; and (5) moribund or dead cases. Most of the specialist teams are working outside the densely populated areas because specialised treatment demands continuity which cannot be achieved in the danger zone. It rests with the classifying surgeon at the C.E.P. to see that patients are evacuated to the right destination sufficiently early to benefit by the care they will receive there. Speed is the most important single factor in the surgical treatment of casualties. In a similar way, surgeons operating at the C.E.P. cannot be spared to go and examine cases; they must depend on the classifying surgeon to send them the right cases in the right sequence. It will be clear that the task of allotting patients to the various groups cannot be left to a first-aid worker, however competent and willing, or even to a senior and experienced house-surgeon. It is a task for the expert and the expert only.

Only a small proportion of casualties will need immediate operation and hospital treatment. It may be possible to provide more than one operating table and surgical team, one of which may specialise in head injuries, another, say, in fractures; it will be the duty of the classifying surgeon to see that appropriate cases are reaching each of the operators. Again, cases sent for resuscitation must be further subdivided into those who can be evacuated when their shock has decreased, and those who will require operation. Cases being sent out of town must be grouped according to the time and distance they are fit to travel, and it may also be necessary to decide what hospital they are to go to. Some of the base hospitals may receive one type of injury only, some may arrange to take only short-term cases and others only cases likely to remain for several weeks. The classifying surgeon would be expected to keep these many points in mind. He may find that some cases can be discharged after their injuries have been dressed and return to the C.E.P. daily as out-patients. His most difficult task will be to decide whether the operating surgeon should give his time to a patient whose chances are small when it may mean that one with a better chance has to be neglected until it is too late to save him. These finer distinctions can only be made by a surgeon with long experience in diagnosis, and the importance to the patient of expert classification at the start can hardly be rated too high.

In order to prevent the classifying surgeon from losing touch with operative surgery, and to give the operating surgeon a respite, these two, with their assistants, should take turn and turn about, changing over every day or every week as was most convenient. The classifying surgeon, with his team, would also be in charge of the treatment of patients in the resuscitation and post-operative beds, and it would be for him to decide when a patient was fit for evacuation.

HOSPITAL TOWNS

The need for protected casualty clearing stations must have been felt by all wounded who have been admitted to London hospitals. Fortunately the casualty-rate has been relatively low and the attack widespread so that no undue strain has been placed on any particular centre. But the casualty list of the hospitals themselves is evidence that patients have been brought from the scene of one disaster only to share in another. The need for C.E.P.s in London is greater in degree, but not in kind, than that in smaller cities similarly attacked. Indeed, in smaller cities the hospitals are often so closely grouped together that a single attack might reduce hospital accommodation severely. The C.E.P. must be a flexible unit modified to suit the district in which it is placed. The aim should be to meet demands as they arise; nothing more permanent is possible while the intensity, length, and disposition of aerial attacks remain unpredictable. The centres should be under central control, but acting to a large extent autonomously.

Large-scale evacuation of patients would call for rearrangement of base-hospital accommodation. Sufficient beds must be kept free for military casualties, but plans must also be made to receive all patients sent out from areas being heavily attacked. This can be achieved by making towns distant from known or expected targets into hospital towns. These could be readily organised to accept large numbers of casualties. Staff and equipment could be concentrated in them. There would be no difficulty about transport of food or medical supplies and it would be easy too to arrange for continuity of medical treatment; moreover, one hospital town could serve many danger areas (fig. 2). In Spain the establishment of hospital towns turned out to be simple. Towns chosen should contain several large buildings which can be converted into hospitals; patients requiring little treatment and nursing care can be quartered in requisitioned houses, and communal kitchens can feed both staff and ambulant patients.

* * *

The scheme outlined here would not be grossly expensive even at the outset, and it would lead in the end to considerable saving in money and man-power. At present the system is not sufficiently unified. The E.M.S. hospitals all serve at least two masters and A.R.P. within London region is carried on under 95 different authorities. The man who digs the patient out is sponsored by a different Ministry from the man who carries him away on a stretcher. The regional boundary, the sector boundary, and the local authority boundaries form an interlacing network of extreme complexity, transport is controlled by three different bodies (fig. 3), and the Ministry of Health and Home Security appear to be politely bewildered by the multiple offspring of their own somewhat elastic union. The mutual support of one area by another is much hampered and it may soon become difficult to keep open communications for so many different services. By putting command into fewer hands it should be possible to achieve both the necessary control and flexibility.

THE annual gathering of supporters of the Hospital Saving Association could not be held this year but Sir Alan Anderson, the chairman, arranged to meet representatives of the eastern and southern branches. The meetings were held on Oct. 29 and 30 at the local offices. The annual report pays a tribute to the work of the group secretaries by whose courage and devotion the work has been maintained in spite of all difficulties. Out of 26 who have been bombed out of their homes 18 were in the South London area. Four group secretaries have been killed by enemy action. The efforts to obtain support from employers have been continued with success and the total from that source exceeded £10,000 for the first time. The loss of income due to war conditions has been small, and the low incidence of hospital treatment has enabled the rate of payment to the hospitals to be made on a higher basis. The total sum, including the final distribution, will be £733,629.

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Public Health

AN OUTBREAK OF PARATYPHOID

By T. Lloyd Hughes, M.D. Lpool, D.P.H.
MEDICAL OFFICER OF HEALTH FOR BEBINGTON; MEDICAL SUPERINTENDENT AT CLATTERBRIDGE ISOLATION HOSPITAL; AND
H. F. Harwood, M.B. Lpool
RESIDENT MEDICAL OFFICER AT THE HOSPITAL.

In an epidemic of 51 cases of paratyphoid B drawn almost entirely from a residential area in the borough of Bebington last year the ages ranged from a baby of 7 months to a woman of 70 years. There was one death, the woman of 70, who died of toxæmic myocarditis.

Age in years..	0–1	1–5	5–10	10–20	20–30	30–40	40–50	50–60	60–70	70+	Total
Males ..	1	2	4	3	2	4	2	2	1	0	21
Females ..	1	3	7	6	2	5	3	2	0	1	30

CAUSE OF THE EPIDEMIC

The first case was notified on Aug. 4, 1939. Five days later 3 cases were notified, and a fifth case was notified two days later. A milk-supply which was a common source to 3 of these was investigated but no organisms of the typhoid group were isolated. Later cases consumed milk, mostly pasteurised, purchased from different sources and so milk was exonerated. By Aug. 28 15 cases had been notified. Careful investigation of the water supplied to the whole district from a common source revealed no organisms of the typhoid group, but many of the cases had eaten confectionery from one shop in the district.

At this shop case 29 had served from time to time since her arrival in the district in mid-July. She had come from a nearby area where some weeks before inquiries had been made at a bakehouse in which she had worked in connexion with 4 cases of paratyphoid fever. She complained of being off-colour and had suffered from headaches and malaise for some weeks. On Sept. 2 she was sent to hospital where she was found to be mildly pyrexial.

Bacterium paratyphosum B was isolated from her urine and fæces and on Sept. 9 her Widal reaction was positive to paratyphoid B in a dilution of 1/250. She was apparently a mild ambulant case, which had been progressing for some time, and it is possible that she was infected in the outside area before moving into the district.

By the beginning of September 29 cases had been notified. During the three weeks following the removal of case 29 to hospital, 18 more primary cases occurred, and 4 further cases, presumably secondary, were afterwards notified, the last on Oct. 31. Each of the 18 cases developing during the three weeks after the removal of the supposed carrier to hospital was found to have eaten confectionery bought at this shop. One case not included in this report was removed to an infectious-diseases hospital in an outside area, and infection could be traced to this epidemic since she had lately been on holiday in the district. Two cases were admitted to a general hospital for investigation as cases of pyrexia, and a third case was admitted on Aug. 6 to a local hospital as appendicitis. She was operated on on Aug. 13 and was later found to be suffering from paratyphoid B. The remaining 48 cases were admitted to the Wirral Joint Isolation Hospital at Clatterbridge. The cases were generally moderate in severity with no obvious toxic effects.

TREATMENT

Of the 48 cases 25 were treated with sulphonamides; the others received no specific therapy. All the patients were kept in bed until the temperature had settled for fourteen days on the four-hourly chart, and only then was phenolphthalein and agar emulsion used to replace enemata. Two cases had relapses. When the patients were allowed up, fæces and urine were taken for bacteriological examination. If *Bact. paratyphosum* B was found the examination of further specimens was delayed for a period of seven to fourteen days. Convalescent carriers were given, primarily as a placebo, salol gr. 5, thrice daily if fæcal excretors, or a hexamine mixture if urinary excretors. When three consecutive specimens of urine and fæces taken over a period of ten days had been returned negative for *Bact. paratyphosum* B the patient was discharged.

To the sulphonamide group of patients, sulphonamide-P was given on admission in a fourteen-day course of 1·5 g. four-hourly, for thirty-six hours, then 1 g. four-hourly, for a variable period and finally 0·5 g. four-hourly to complete the course. Cyanosis and nausea were noticed in a few patients, but were never severe enough to cause the drug to be discontinued and no signs of granulopenia were detected. In the table the course of the infection in the two groups of patients is compared. Sulphonamide does not seem to have influenced the length of pyrexia, and no more rapid clinical improvement was noticed in this group. But the number of days before fæces and urine were first returned negative and the number of days of illness do seem to have been shortened in the sulphonamide group.

—	No. of cases	Days of pyrexia	Days of illness	Days before returning fæces and urine neg.
Sulphonamide group ..	25	21·5	78	64
Other group..	23	23	92	80

CARRIERS

Two chronic carriers have emerged, one a woman of 55 whose fæces and urine both still contain *Bact. paratyphosum* B in considerable amount, and the other a man of 60, who is a fæcal excretor only. Both these patients are living at their homes on the advice of the Ministry of Health and under strict public-health surveillance. Neither, either in their acute illness or later, had been treated with sulphonamide, but both have had a course of injections of an autogenous vaccine without any apparent result. However, since both in their acute illness showed signs of involvement of the gall-bladder, they are to be given the choice of cholecystectomy. This was not suggested earlier, because they are both poor operative risks.

BACTERIOLOGY

Dr. R. Howard Mole, bacteriologist to the hospital, reports as follows:—

The laboratory diagnosis was almost entirely based on the Widal reaction, since the excreta of new suspected cases were not sent to us for examination. In the earlier cases of the epidemic a full Widal was done. After the epidemic had become established the blood-serum of the patients was tested against *Bact. paratyphosum* B only. Most of the cases tested were positive in a dilution of 1/250. The outbreak of war made routine testing in higher dilutions impossible. Occasionally the sera were tested in high dilutions, and positive reactions in 1/500, 1/640, 1/1280, 1/2500, and 1/3560 were recorded. The only case examined by blood-culture was positive for *Bact. paratyphosum* B at the same time as the blood-serum gave a positive Widal. The fæces were negative but were positive six weeks later.

Some of the patients quickly lost the paratyphoid B organism from the excreta, sometimes only a few days elapsed after the establishment of a positive Widal before it became negative. But usually some weeks were required, and periods of 3, 4, 5, 6, 7, 8, 10 and 16 weeks were recorded.

The occurrence of the organism in the excreta is intermittent. Several cultures from the excreta were sent to Mr. A. Felix, D.Sc., of the Emergency Public Health Laboratory Service, School of Pathology, Oxford, for confirmation. He reported the organism in each case as containing the H, O and Vi antigens of *Bact. paratyphosum* B.

The earlier cultures of the organism from fæces and urine were done on MacConkey's agar from an incubated broth culture. But this was abandoned, and, on the advice of Prof. H. D. Wright, the Wilson-Blair method as modified by F. Tabet (*J. Path. Bact.* 1938, **46**, 181) after tetrathionate broth of Müller (Schäfer's modification) was then used and proved satisfactory.

The epidemic showed the necessity for investigation of every article of food which might convey infection, for in paratyphoid water is not as common a vehicle of infection as in the pure typhoid group. The wide distribution of infection among the age-groups is interesting

Two young infants were infected—one, a secondary case, by the mother—but it was suggested that the other, a child of 11 months, was infected by cakes soaked in milk.

Our thanks are due to Dr. J. B. Yeoman, who was the medical officer of health for the district during the earlier part of the epidemic, and to Mr. E. V. Crapper, the chief sanitary inspector for Bebington, and his staff.

From the School Reports

In 1938 the people of *Kettering* numbered 33,900, of which number 3993 were children on the school register. In September, 1939, this population received from London 6738 persons, of whom 3745 were unaccompanied children. Most of our small boroughs were fairly prosperous, well housed, and, as evacuation proved to those who did not know it before, well supplied with health services which were vigorous and comprehensive. Though their populations were increasing their density was declining owing to better housing and the falling birth-rate. So a borough of 40,000 could readily absorb 7000 added population. But it is another matter for an educational system designed for 4000 to accommodate an increase of 100% within a week. This did require planning beforehand and a fine system of absorption, and, in spite of all adverse comment, most boroughs gave both. The reception of school-children from the evacuated areas by the boroughs was in fact a most successful venture. Kettering was a typical case of a borough doing the job well. Dr. Cecil B. Hogg, S.M.O., gives a full account of how it was managed. Previous to reception it was decided that in order to prevent the spread of infections the received children should not go to school during the first fortnight after their arrival to "limit the amount of mixing." In most reception areas this limitation of mixing occurred by accident, but Dr. Hogg is to be congratulated on having planned it. An application to employ a temporary medical officer was made to the Ministry of Health and the Board of Education on Sept. 13, but sanction was not obtained until Dec. 6. Delays of this kind exasperated local authorities, who knew what they needed and how to get it, but were hampered by the central authorities who did not know what was required. The children received by Kettering from the metropolitan area were an average sample of evacuated children. All the smaller boroughs found the children they received below the local standard; some knew what they were about to receive, but others did not. Up to the end of 1939 the influence of reception on the incidence of infectious diseases in Kettering was negligible except in regard to chickenpox in which it appears that the newcomers set up an epidemic situation.

Dr. J. A Fairer, of *Leicestershire*, gives some information on reception in a receiving county. Leicestershire took in 9865 school-children from London, Birmingham and Sheffield, but half of them returned home before the end of the year. Reception into county areas was rather different and much more difficult than into the boroughs, for reasons which were obvious to those who knew the state of elasticity of billeting and of the local health services. Moreover, the change from city to town is far less drastic than from town to country. Enuretics, who gave the most troublesome single problem of evacuation, are more difficult to manage in country districts than in towns where the provision of special hostels for them is feasible. The segregation of enuretics does not solve their problem and probably is unfavourable for their cure, but it did allow time for deciding what eventually should be done with them. Dr. Fairer voices the general complaint of receiving authorities when he says: "it has always been understood that in the larger cities the health services had reached such a high degree of efficiency that this state of affairs was impossible." The strength of a medical service is not gauged by numbers treated but by the proportion of people who receive its benefits.

Dr. J. L. Burn of *Barnsley* includes in his report a chapter on oral hygiene by Mr. A. G. Moxon, the senior dental officer, in which attention is called to a setback in the cause of oral hygiene from the discovery of the action of vitamins on tooth structure. "The laity and many professional men have sprung to the conclusion that to keep teeth good added vitamins is all that is needed." He is a great advocate of the toothbrush for its mechanical action, but decries the fuss made over tooth pastes and powders which diverts attention to some mysterious power alleged to be possessed by the various proprietary brands. Oral hygiene consists today, as it always has done and always will do, of exercising the jaws and keeping the mouth clean. All organs deteriorate and eventually are lost if they are not exercised, so however well formed the teeth may be they will be lost if they are not used. The cleanliness of the mouth required is merely to keep it free from accumulations of rotting material. The mouth is not aseptic and cannot be made aseptic, but it must be kept free of gross filth. Mr. Moxon brings out these two requirements forcibly and in a way the general public will understand. Perhaps in time we shall all come to recognise that the only way to keep our mouths clean is to cleanse them everytime we have finished a meal, and our children may serve round toothbrushes after a banquet as our fathers served finger-bowls (or toothpicks).

INFECTIOUS DISEASE IN ENGLAND AND WALES

DURING THE WEEK ENDED SEPT. 28, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1755; whooping-cough, 1253; diphtheria, 1153; enteric fever, 60; measles (excluding rubella), 7910; pneumonia (primary or influenzal), 603; puerperal pyrexia, 144; cerebrospinal fever, 129; poliomyelitis, 47; polio-encephalitis, 4; encephalitis lethargica, 5; dysentery, 68; ophthalmia neonatorum, 116. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 27 was 1797, including: scarlet fever, 226; diphtheria, 208; measles, 457; whooping-cough, 38; enteritis, 57; chicken-pox, 53; erysipelas, 33; mumps, 3; poliomyelitis, 1; dysentery, 2; cerebrospinal fever, 21; puerperal sepsis, 13; enteric fevers, 24; german measles, 5; encephalitis lethargica, 2; other diseases (non-infectious), 47; not yet diagnosed, 87.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 2 (1) from enteric fever, 3 (0) from scarlet fever, 7 (0) from whooping-cough, 10 (0) from measles, 37 (2) from diphtheria, 35 (5) from diarrhœa and enteritis under 2 years, and 17 (2) from influenza. The figures in parentheses are those for London itself.

Greater London and Plymouth each reported a death from enteric fever. There were also 6 deaths from diphtheria at Plymouth. Liverpool had 5 fatal cases of measles.

The number of stillbirths notified during the week was 218 (corresponding to a rate of 34 per thousand total births), including 17 in London.

WEEK ENDED OCT. 5

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1872; whooping-cough, 1332; diphtheria, 1163; enteric fever, 77; measles (excluding rubella), 8852; pneumonia (primary or influenzal), 651; puerperal pyrexia, 140; cerebrospinal fever, 112; poliomyelitis, 34; polio-encephalitis, 2; encephalitis lethargica, 5; dysentery, 63; ophthalmia neonatorum, 91. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 11 was 1866, including: scarlet fever, 262; diphtheria, 250; measles, 419; whooping-cough, 46; enteritis, 38; chicken-pox, 85; erysipelas, 39; mumps, 7; poliomyelitis, 2; dysentery, 2; cerebrospinal fever, 26; puerperal sepsis, 8; enteric fevers, 25; german measles, 1; other diseases (non-infectious), 90; not yet diagnosed, 100.

Deaths.—In 126 great towns, including London, there was no death from smallpox 2 (1) from enteric fever, 2 (0) from scarlet fever, 11 (0) from whooping-cough, 12 (0) from measles, 31 (1) from diphtheria, 44 (8) from diarrhœa and enteritis under 2 years, and 9 (2) from influenza. The figures in parentheses are those for London itself.

Greater London and Birkenhead each reported a fatal case of enteric fever. There were 7 deaths from diarrhœa at Birmingham and 6 at Hull. Birmingham also reported 4 deaths from whooping-cough and 4 from diphtheria. There were 4 deaths from measles at Liverpool.

The number of stillbirths notified during the week was 206 (corresponding to a rate of 34 per thousand total births), including 19 in London.

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Letters to the Editor

MALARIA ON BOARD SHIP

SIR,—Information volunteered by a chief engineer of the Merchant Service emphasises that calling at a West African port has been followed by a high mortality-rate from malaria, although instructions have been issued that quinine is to be taken as a prophylactic measure for ten days before reaching the port and during the ship's stay there. This statement, if true, deserves very serious consideration from malariologists. In recent years clinical investigations, under the direction of Dr. W. D. Nicol, have been made at the Horton malaria therapy research centre (of which I was till lately in charge) into the relative efficacy of quinine and Atebrin in the prevention of therapeutic malaria, and the results obtained indicated that, whereas atebrin is a true causal prophylactic, quinine is not, and moreover that in adequate prophylactic doses atebrin has no serious toxic effects.

In the light of these findings it would seem that much unnecessary loss of life might be avoided by substituting atebrin for quinine. This is possible as a drug identical with atebrin is now being manufactured in this country. In view of the seriousness and urgency of the situation, the validity of these observations should be carefully considered, and the opinions of the many malariologists who have studied prophylaxis should be put before the Ministry of Health.

E. L. HUTTON.

Burden Neurological Institute, Bristol.

SIR,—The range of the malaria-carrying mosquito is so often a subject of pure speculation that any accurate information on this subject should be recorded. Text-books (I have no reference books on board) generally give 400 or 440 yards as the maximum flight of the mosquito and suggest that if a ship is moored beyond that distance from the shore the occupants will be safe from mosquito-borne diseases—e.g., malaria and yellow fever. The following incident indicates that there are exceptions to this rule.

I am a passenger on a ship bound for Colombo. We sailed from Southampton, leaving at night, and sighted no land until we arrived at Freetown on the 10th evening where we stayed until the 12th morning. The ship was moored well over a mile from the shore (this fact was confirmed from the bridge). The harbour was crowded and there were at least two ships between us and the nearest shore. A large oil-lighter lay alongside us for one night and the boat was visited by many motor launches and small country craft. The passengers were allowed ashore. I was told that it was the height of the malaria season in Freetown. We next called at St. Vincent * on the 14th and again moored at least a mile from the shore, but in the 14th evening called at another island of the Cape Verdi group where water was taken on and here we lay about 600 yards from the shore. On the 29th day of the voyage I was asked by the ship's surgeon to see a passenger in consultation. He was a young man, aged 21, who had never left England before; he had felt ill on the 23rd, the day after his second T.A.B. inoculation, and he had a sharp local reaction; on the 25th his temperature rose again and he was admitted to the ship's isolation hospital with a temperature of 102° F.; the next day he was slightly better, but on the 27th his temperature rose to 102° F. and he vomited; it fell to 99° F. on the 28th, but on the 29th it rose again to 102° F. and again he vomited. He had no rigors, but he sweated profusely when the temperature fell. His tongue was furred, but not markedly so, on the day that I saw him, and his spleen was an inch below the costal margin, but came down to about three inches on deep respiration. His pulse was persistently below 100 per minute and his respiration-rate was never increased. A provisional diagnosis of enteric had been made and it was suggested that the course of the disease was being modified by inoculation. His temperature chart suggested malaria, but this diagnosis had been ruled out as highly improbable in the circumstances. I did not feel that I could support the diagnosis of enteric and I recommended that a blood film be taken; in this film I found a heavy malignant tertian infection, an average of over two rings per field with many erythrocytes containing two rings. He was given quinine and made an uneventful recovery.

This finding led to the reconsideration of another case, a girl aged 15, who had been in India as a child, but had been in England for seven years and had had no malaria. She first complained of fever on the 24th day of the voyage and her temperature rose sharply, to 103° F. on the 26th and to 102° F. on the 28th, falling again to normal each evening. Her guardian, who is a doctor, gave her atebrin on the 27th after taking a blood film; the temperature came down after two days, but from other observations a diagnosis of *B. coli* infection was made and the blood film was not examined. I did not see this patient, but I was asked to examine the blood film which had been kept and in the first field I found two malignant tertian rings. The ship's surgeon told me that two other patients, both Indians who had been in England some years and had not had malaria during this period, had clinically typical attacks of malaria on the 24th and 25th; these responded to quinine.

In the first of these four cases the malaria was certainly acquired on board, in the second case almost certainly. All four cases were amongst the tourist-class passengers who were accommodated in the stern of the ship and whose cabins were on lower decks than those of most of the first-class passengers. At Freetown a certain number of country craft came alongside selling fruit and other things; most of the trade was done with the tourist passengers. The patients were all four in different cabins and the cabins were some distance from one another, so that it seems likely that (if they were all four cases of malaria) more than one infected mosquito came on board. That the infected mosquitoes came on at Freetown seems almost certain. That they were on board before can surely be ruled out, as they could scarcely have been lurking inactive since the ship last touched at a malarious port about two months earlier, and nine days would be too short an incubation period to allow for their coming on at the Cape Verdi island, even if this were malarious and I have no information about this.

As to how the mosquitoes came on board there are many possibilities. They may have been blown directly from the shore, they may have hopped from ship to ship, or they may have come in the oil-lighter, in the motor launches, or finally in the country boats with the fruit. Speculation on this point will not be profitable, but to me it seems most likely that they were simply blown from the shore, as there was a moderate wind off the land part of the time. This incident does suggest that the passengers and crews of ships lying even a mile from a malarious shore may become infected with malaria. The same remark will apply to yellow fever.

At Sea off Colombo, Aug. 18. L. EVERARD NAPIER.

* Some correspondent may point out that one would normally touch at St. Vincent *before* reaching Freetown. Times are not normal and we didn't.

E.M.S. SALARIES

SIR,—Two days ago the part-time E.M.S. consultants of my sector were informed confidentially of the new proposals for terms of service. These are no doubt what Sir Ernest Graham-Little had in mind in his letter of Oct. 5. Mr. Maxwell Ellis has already written on Oct. 12 a letter of protest with which I am in full agreement, although he at the time could not have known the degree of insult contained in those terms, which Sir Ernest has defended in your issue of Oct. 20.

Ever since the Munich crisis some idea of an E.M.S. had been in the mind of the Ministry of Health, but the majority of London consultants were called up into the E.M.S. during the last week of August, 1939, and were only presented with a contract two days before the outbreak of war, Hitler having already set the fashion for short-time ultimata. The terms were such that few would have signed them had they had a chance for discussion, involving as they did (1) cessation of private practice; (2) salary less than R.A.M.C. major, the corresponding consultant rank, and without the tax-free allowances of an army officer; (3) no provision for pensions as in the Services; and (4) an ill-defined term of

contract, apparently elastic and breakable on the ministry's side but binding on the consultants.

After three months of enforced inactivity the ministry began to be alarmed at the cost of maintaining such a service, although no alarm is felt at the prospect of paying idle men in the Services for an indefinite period; and as the number of consultants who for one reason or another had declined to join the E.M.S. was insufficient to meet the demands of the public we were strongly urged to accept the part-time offer.

Since then I have twice tried to join the R.A.M.C. A majority in those days was fairly certain—as Mr. Maxwell Ellis says, the vacancies were being filled by our registrars and house-men—but the E.M.S. refused to release me. At last in September Goering's long-threatened air attack on London provided the conditions for which we had been conscripted, and now that I feel that I really am earning my E.M.S. retaining fee on the recommendation of a select committee of wage cutters I am offered a greatly reduced standing fee to retain the services of a consultant and payment for actual work done at an insolently low rate of pay.

If Goering is kind to me and drops his bombs near (but not too near) the hospital to which I am attached, I may earn a living wage; otherwise for a miserable pittance I am to remain at the beck and call of the E.M.S. Thus for the second time the Ministry of Health seeks to bully consultants into signing contracts to work for them under very disadvantageous conditions. On the first occasion the consultants signed because the war was already upon us and then was not the time to stand out for pensions and the like. On this occasion the consultants, having been kept from joining the Services, and whose practices are now at the lowest ebb, may feel forced to sign any contract that is better than nothing. I hope my fellow consultants will this time make a stand and persuade the Ministry of Health to come to some equitable and final terms.

Wimpole Street, W.1, Oct. 30. F. W. ROBERTS.

DEATH AND DYING

SIR,—Professor Ryle's attitude to religion and the hereafter is perhaps best explained by Newman in his "Idea of a University." Speaking of Christianity and medical science, he says:—

"A medical philosopher, who has so simply fixed his intellect on his own science as to have forgotten the existence of any other, will view man, who is the subject of his contemplation, as a being who has little more to do than to be born, to grow, to eat, to drink, to walk, to reproduce his kind, and to die. He sees him born as other animals are born; he sees life leave him, with all those phenomena of annihilation which accompany the death of a brute. He compares his structure, his organs, his functions, with those of other animals, and his own range of science leads to the discovery of no facts which are sufficient to convince him that there is any difference in kind between the human animal and them. His practice, then, is according to his facts and his theory. Such a person will think himself free to give advice, and to insist upon rules, which are quite insufferable to any religious mind, and simply antagonistic to faith and morals. It is not, I repeat, that he says what is untrue, supposing that man were an animal and nothing else; but he thinks that whatever is true in his own science is at once lawful in practice—as if there were not a number of rival sciences in the great circle of philosophy, as if there were not a number of conflicting views and objects in human nature to be taken into account and reconciled, or as if it were his duty to forget all but his own; whereas

> There are more things in heaven and earth, Horatio,
> Than are dreamt of in your philosophy.

I have known the most detestable advice given to young persons by eminent physicians, in consequence of this contracted view of man and his destinies."

Professor Ryle, I am sure, would not wish to claim that he is a Daniel come to judgment in his conclusions about man and immortality of the soul. Others before him, who have devoted themselves to a study of the human body and its reactions in health and disease, have clamped down on their observations, well content in mind that they have solved the riddle of the universe, and that God and the hereafter were myths. I have the greatest admiration for Professor Ryle's contributions on medical subjects. That does not mean to say that I do not enjoy his digressions, particularly when he seeks to pontificate on things not quite germane to his subject. Then, I think, he is almost at his best. Let us hope that in a future article he will again wander delightfully from his subject and treat us to something about the origin of the sun, and the moon, and the stars, the earth we live on, and the origin of life and its objects; why man is mortal and the planets seem eternal. These questions engaged the minds of those profound thinkers and philosophers, Socrates and Plato, Augustine and Aquinas, as well as the minds of the great scientists, Newton and Kelvin, and made of them not atheists but theists.

In our own profession the greatest benefactors of mankind, Pasteur and Lister, were firm believers in the Deity, and even Charles Darwin could not subscribe to Professor Ryle's views. But then, of course, these men belong to a bygone age and really their views are not suitable for modern times.

Harley Street, W.1. MICHAEL J. SMITH.

SIR,—I have received by post, with one dissentient criticism, so many grateful and confirmatory letters on the above subject that I am not greatly disturbed by Sir Francis Fremantle's misinterpretations of my theme or by his accusations of naked materialism and shallow paganism. To me it does not seem that the quest for truth and a desire to help one's fellow mortals here and now can be inspired by irreligious motives. I have not, as he and Dr. Harwood Stevenson suggest, denied the separate existence of spirit or of an after life. I have merely adopted the agnostic position. I do not know the truth about these things because I have no direct experience of them and have never met anyone who has. If they do exist then I merely maintain that they must involve a different kind of experience from that provided by the living sensorium.

Sir Francis asks "What vestige of evidence has Dr. Ryle that will and choice, love and hatred, reproduction, creation and life are dependent on 'the structures which subserve life' and are dissolved at death"? The evidence for the dependence of the first five of these phenomena on the integrity of a living nervous system has long since been provided by physiology and psychology, and supported by such men as Darwin, Cannon, Pavlov, James and Lange. Creation and the nature of life itself did not enter my discussion. But what vestige of evidence, I would ask in turn, has Sir Francis that will and choice, love and hatred, and reproduction (sic) continue after death? Many of us find so much in nature to be studied and understood that is both beautiful and good and so much to compensate for what is ugly and bad, so much evidence for the indestructibility of matter in the universe, for the long persistence and development of race and for the evolution on earth of human personality and the good in man, that we prefer not to speculate on other forms of continuity elsewhere.

To Dr. Stevenson I would point out that what he refers to as my "statements" (as though to imply assertions of fact) I describe undogmatically as "the rationalist's picture." I believe the rationalist to be at least as entitled to his picture, and to invite the contemplation of this picture by others who are fearful or in doubt, as others are to enforce the contemplation of their picture (often with frightening effects) on children and adults who have not reached the age or stage of reason.

London, S.E.1. JOHN A. RYLE.

GLYCOSURIA IN MENINGOCOCCAL MENINGITIS

SIR,—In your issue of Aug. 24 Drs. Ward and Driver describe a case of meningococcal meningitis starting with diabetic coma. The following is a rather similar case.

On July 21 a boy aged four was admitted to Hertford County Hospital. He had been quite well till two days previously when he developed a cold with watery eyes. On July 20 he was feverish at noon and complained of aches in his limbs, nausea and thirst. In the evening abdominal pain and headache developed. During the night he vomited several times. On the day of admission he became rapidly more ill and at 2.30 P.M. his doctor found him very drowsy and rousable only with difficulty, and with complete flaccidity of all his limbs. His temperature was 103° F., pulse-rate 120,

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and he showed air-hunger, acetone in his breath and a urine loaded with sugar and acetone. He was given three lumps of sugar and 15 units of insulin and sent into hospital with a provisional diagnosis of diabetic coma. On admission two hours later there was definite neck-rigidity and a positive Kernig's sign. Lumbar puncture produced turbid fluid under increased pressure and containing meningococci as shown by smear and culture. Two hours later the urine contained much acetone but only a small amount of sugar. After six hours, and subsequently, no sugar was found in the urine though acetone persisted for two days. During this time the child was given glucose orangeade, a large proportion of which he vomited. One convulsion occurred with extension and hyperpronation of the arms and conjugate deviation of the eyes upwards and to the right. Head-retraction became marked and with the stuporose condition remained for a week, but eventually the disease responded to intramuscular and oral sulphapyridine. The child is now completely well and the blood-sugar curve is normal.

In this case it is possible that the glycosuria and ketosis were due to a transient insulin deficiency from the acute toxæmia, since very little sugar was eventually necessary to control his ketosis. I have to thank Dr. Brian Stanley for permission to mention this case.

Hertford. R. R. HUNTER.

VENOUS LIGATURE AND PARTIAL ARTERIECTOMY

SIR,—In a recent leading article (*Lancet*, Oct. 26, p. 524) you stated that "in the last war Makins, Tuffier and others established as a fundamental principle of vascular surgery that when an artery is tied the companion vein must be tied as well." I am sure you are claiming more than Makins, who first advised this procedure, ever claimed. He only suggested tentatively on the experience of a few cases that the method was worthy of trial (*Lancet*, 1917, 1, 249). He was supported by Cowell with reports on 5 cases (*Brit. med. J.* 1917, 577). As far as I am aware no subsequent body of evidence has been produced to support the thesis. As far as my own experience goes there is no evidence in favour of or against it. From my notes of cases in the last war, I have records of 37 cases of ligature of main arteries excluding the vessels below the knee and elbow. The analysis of these is as follows.

	Ligature of Artery only (18 cases)		*Ligature of Artery and Vein* (19 cases)	
	Gangrene	No gangrene	Gangrene	No gangrene
Carotid ..	1	—	0	1
Axillary ..	2	4	0	2
Brachial ..	1	2	0	1
Femoral ..	0	4	1	6
Popliteal ..	2	2	5	3
Total ..	6	12	6	13

As will be seen these figures lend no support to the thesis that ligature of artery and vein affords protection against gangrene. These figures do not include any cases complicated by fracture or gas gangrene.

In my view the most that can be claimed for this "fundamental principle" is that it is an interesting suggestion worthy of fuller investigation.

Wimpole Street, W.1. G. T. MULLALLY.

INDUSTRIAL TUBERCULOSIS

SIR,—Your correspondents appear to be in general agreement over this aspect of social medicine. The isolated success of Papworth, even if repeated, must not blind the profession to the need for a great coördinated national effort. A national tuberculosis scheme voluntarily accepted by patients must not be regarded in the same light as schemes launched under the alleged voluntary principle, such as Papworth, however agreeable and however high the standard. Such places, appertaining to a so-called voluntary system which has been stripped of the basic principles of voluntaryism, are not the alternative to or opposite of a national scheme, whether patients under such a national scheme are to be compelled to seek treatment or not. My view is this: to produce a maximum effort and to minimise the difficulties of persuading the patient to accept treatment and diagnostic investigation, a national scheme of prevention and treatment of tuberculosis must be under national unified supervision but with local effort interwoven and coördinated; and it must be a scheme ensuring no risk of loss of economic security or status to potential or actual sufferers or patients. If that were done, in my view, citizens would voluntarily submit to the necessary early investigation and examination without hesitation; there would be no need for compulsory treatment, which in a country like Great Britain is neither essential nor desirable.

I differ from Sir Pendrill because he would prefer a series of centres on the lines of Papworth run by voluntary effort. In any national scheme there might be scope for limited voluntary effort but the scheme must be national, under the supervision of the state, with communal responsibility for its establishment and finance, and run on representative democratic methods. I do not believe that an extension of the present voluntary scheme would fit the bill without that state finance. I differ from him in insisting on minimum economic security. The worker has been realising for some time that some publicists are prepared to do anything for him except to give him control of the administration of any scheme.

Industrial Orthopædic Society. H. B. MORGAN.

TOXOID IMMUNISATION

SIR,—The idea that toxoid immunisation for diphtheria is a perfectly safe procedure and the glowing accounts of its results emanate entirely from the official health services. The resulting deaths and the numbers of healthy carriers produced are not mentioned. In eleven families which I have attended since diphtheria began to be prevalent here in May, 1939, there were among immunised children 11 cases requiring hospital treatment and 9 carriers. In addition there were 19 cases, 3 of them fatal, among the contacts; 9 of these were adults, all except 1 parents of the children. All other causes of the outbreak have been eliminated by the health authorities and myself. The infection appears to be most virulent at the end of a year. When the second outbreak began I was asked if I would immunise the children, but I pointed out that the cause of the epidemic was the children already immunised and the remedy was to trace the carriers. This was done and the most recent carrier discovered by swabbing was sent to hospital a few days ago (Oct. 7). The cases are very atypical. Two laryngeal cases had no symptoms beyond catarrh, in 2 the vulva was infected, in 1 the skin. I ask whether a vaccine would not be a safer and more satisfactory method of immunising children against diphtheria.

Handley, Salisbury. G. BAYNTON FORGE.

ASPIRIN AS A GARGLE

SIR,—I have used for many years a suspension of gr. 10 of aspirin in warm water after tonsillectomies, and I am confident of its local anæsthetic effect. This manifests itself within a minute or two, and is not dependent on the aspirin being swallowed. However, swallowing certainly adds to the effect, both by carrying particles further down the fauces to other raw areas, and subsequently by the central action of the drug after absorption. The primary effect is not seen in inflammatory conditions such as tonsillitis and "sore throat," presumably because there is no mass destruction of the mucous membranes. The gargle should be given immediately before meals, and it is gratifying to see patients able to swallow solid food without difficulty directly afterwards.

Wellington Court, N.W.8. S. C. LEWSON.

THE DOCTOR'S CARAPACE

SIR,—Most of us travel on our lawful occasions during air-raids, and in so doing are exposed to the remote chance of personal injury. A direct hit from a heavy bomb would be just too bad, but injury by falling splinters, most of which will easily penetrate the pressed steel of a car body, is more likely and more easily guarded against. Of the safeguards usually seen, a steel sheet is hard to obtain and difficult to fix, and a double-bed mattress strapped to the roof is slightly ridiculous. A simple and very cheap protection can be arranged inside

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the roof, by cutting a sandwich of five layers of "chicken wire" with four of army blanket between them to shape, and retaining it with a sheet of beaver board sprung into place. If need be the board can be coloured to suit the decoration of the car.

Harley Street, W.1. W. H. OGILVIE.

MASKS IN THE SHELTER

SIR,—The letter from Mr. T. H. Sanderson-Wells in the *Times* of Oct. 21 deserves the closest attention. He appeals for the universal wearing of gauze operating-theatre masks by all persons who may suspect themselves of sickening for, or of having, colds and influenza in air-raid shelters and other confined spaces. He supports his plea by a striking illustration from his own hospital in the 1918–19 epidemic. Those who have experience of this method of prophylaxis will, I think, agree both upon its difficulty and effectiveness.

Wembley. H. M. HARRIS.

BLOOD SEDIMENTATION INDEX

SIR,—Dr. Phillpotts suggests that blood may be kept up to 24 hours before being used for the determination of Day's sedimentin index. In a considerable number of experiments carried out here, similar to those described by Dr. Phillpotts, it has been found that while there is no appreciable error after ½ hour delay the variation after even 4 hours delay may be as much as 10% either way in the sedimentin index. Since the chief value of the sedimentin index lies in repeated readings at intervals it is clear that delay of more than ½ hour in putting up the blood may introduce considerable errors.

Crossley Sanatorium, Frodsham. A. K. MILLER.

A SHELTER CASUALTY

SIR,—Because of the present attention being devoted to the use of bunks arranged one above the other in air-raid shelters the following case may be considered of some interest. A boy of 13 was sleeping in an air-raid shelter in one of the upper-level bunks, at a distance of about 6 feet from the floor. The bunk was only 2 feet 6 inches wide and there was nothing at the side to prevent his falling out. In his sleep he turned over and fell to the floor. He was admitted to hospital vomiting and in severe pain, and we found at operation that his spleen was torn almost completely in half. There were no other injuries of any kind, and he is now making a normal recovery from splenectomy. This accident might have been averted by the simple expedient of fixing a board at the side of the bunk away from the wall.

Addenbrooke's Hospital, Cambridge. H. T. LAYCOCK.

HORMONE TREATMENT OF UNDESCENDED TESTIS

SIR—Dr. Eisenstaedt's letter about your leading article of Sept. 14 emboldens me to add a similar mild protest. In a recent paper (*Brit. med. J.* 1938, **2**, 168) I stated that there was an anatomical fallacy in the papers advocating hormone treatment, in that the testes they described as being in the inguinal canal before treatment were actually in the subcutaneous tissues of the abdomen, having ascended out of the canal into a structure I called the inguinal pouch. On the understanding of this structure I based rules for distinguishing the 20% of "undescended testes" that will not come down spontaneously from the 80% that will; and I suggested that the latter were the same 80% as were reported cured by hormones. If I am right, surely this fallacy is an important factor in the discussion; and if I am wrong a good many of my opponents would like to know where I have been proved so.

DENIS BROWNE.

Four Honyman Gillespie lectures will be held during the autumn term at Edinburgh Royal Infirmary on Thursdays at 4.30 P.M. On Nov. 14, Mr. F. E. Jardine will speak on inspection; on Nov. 21, Dr. A. Ninian Bruce on the basis of temperament; on Nov. 28, Dr. John McMichael on circulatory collapse and shock; and on Dec. 12, Dr. Charles Cameron on modern methods of treating lung tuberculosis. The lectures are open to all graduates and senior students.

In England Now

A Running Commentary by Peripatetic Correspondents

ANYONE who has read Churchill's "Marlborough" cannot fail to notice the similarity in character of the great Duke as depicted there and our present Prime Minister. Is it heredity, dominant genes having come through in sufficient numbers to give likeness? Or did Mr. Churchill model himself on his ancestor, with whose shadow he must have grown up, whom he must have studied closely for years? Or has he in painting a picture of Marlborough unconsciously given us only a picture of himself, by the process, known in every schoolboy, of identifying himself with his hero? Anyhow there it is: tenacious, brave, of a reasoning suavity, forgiving and friendly to his erstwhile detractors whose flattery must surely nauseate, opportune in making the best of poor material that lies to hand, humorously ruthless, even down to one of Marlborough's little weaknesses, a not unamiable tendency to a spot of nepotism. One great quality, possibly the very kernel of leadership, these great captains seem to have—a clarity of vision which makes them fix their eyes with the frank gaze of children on that for which they are fighting. Marlborough fought against one man; Lincoln fought against one word—secession. Mr. Churchill also in one word has stated the stake in the present conflict—survival. Is this an exaggeration? Possibly not; history has many instances of the disappearance of a nation after defeat; even the Medes and the Persians sank from imperial pomp to a third-class power after the defeats of Xerxes, though they took a few centuries in doing it. If the German wins this war it is conceivable that we shall become a second-class power, face centuries of retreat, humiliation, impotence, and finally absorption, extinction. But he can't win. The Teuton myope has prepared for victory down to the last satanic detail, but he is a myope. This is no question of territories nor dynasties but a plain natural-history problem of regression or evolution. The German cannot see that no people can endure to victory who have been deprived of their latest acquired and highest faculties. He might as well have deprived them of sight. Will man submit for long to have withheld his passport for all venturing, the one flickering flame that he has wrested in his million years struggle from the beasts, his one possible claim to immortality? No fear. But ere the struggle strengthens let us clear the dirt from our own eyes—for instance, stamp out privilege as though it were a plague, bring to trial those who have been imprisoned without a hearing. The knight goes on a crusade only after vigil, humble and cleansed. Meanwhile, for those that have not read them, Churchill's "Marlborough" and Wells's "Outline of History" will help to defeat the blackout. If you want it blacker still you might add Hansard 1920–40 and the last line of Kipling's "Recessional."

* * *

Next to and perhaps even greater than that of the adjutant is the power wielded by the medical officer to an infantry battalion. He is even more of a general adviser and link between the men and their company commander than the padre himself. He listens to the complaints and worries of the men in the calm atmosphere of his inspection tent away from the rigid standing to attention and bawling of the company office. The M.O. can thus find out far more easily than the company commander which of the men are shirking their job, and which, by reason of their mental unalertness and poor physique, are really the type who should be picking up paper or cleaning the latrines. Perhaps a perfectly fit man will try to "swing the lead," or as the modern officer calls it "put over a smooth one." The company commander can warn the doctor about his suspicions, but the final word about fitness for duty rests with the doctor. Then there is that personal feeling of comfortable safety which a kindly and efficient M.O. can bestow—of always having at one's beck and call someone who will sympathise with and explain those minor ailments that come upon the junior officer during his first month or so in this new and energetic life. It is so easy to go and get proper attention to that sprained foot, that swollen ankle, that strained wrist, or that pain just over

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the appendix (due of course to a too-lengthy route march) which one fears may be serious—and all free of charge. Even that great man the C.O. when he is feeling a bit off colour treats the doctor in an extra friendly way, wondering whether in the past he has been friendly enough. In his own quiet way the M.O. is an important person.

* * *

In the case of the bowel and its appendages, and to some extent in the case of the heart, man quite early realised that the overhead charges of running two establishments would be prohibitive, and so very wisely amalgamated. But he still has two legs, uses them equally, and under present circumstances could not do with less. In the matter of arms, for several millennia he has been using one more than the other, and eventually may attain to the success already achieved by some crabs of unity in this respect. With the generality of his organs he has insisted on having spare parts in case of unlikely accidents, not daring to take the irrevocable plunge which unity demands.

Most children have a naughty alter ego, a disgusting child who is responsible for all their crimes, leaving them sinless, smug, and reproving. Naughty Jane and Bad Kaka were the names of two of these spectral young criminals whom I happen to remember. Osler, being a very natural sort of man, not unduly shackled by convention, carried this mechanism into adult life; James Bovell was guilty of any misdemeanour which might have been attributed to Osler. Of course quite a lot of people have this second self, but few own up to him. On a blank parchment page in the parish register of my old home some village clerk, probably testing a quill pen, had written over and over again "John Holly 1620." The name appealed to me as a boy; it was so English, it took one back to a rather jolly time in history, it had a tang of the hedgerow, perhaps he was a bit of a poacher, and although I don't approve of the fellow he has been a fairly frequent companion of mine ever since, has even signed hotel registers, written doubtful articles, and one night gave his name to a policeman who stopped him for riding a push-bike without a light. Some years ago I read a surgical article describing the removal in seven cases of cerebral tumour of nearly the whole of one hemisphere. Those who survived were said to be mentally normal. But were they? Did they make sure that in removing half of the brain they had not also removed a Naughty Jane, a Bad Kaka, a John Holly or some equally lovable but disreputable person? Isn't it probable that the brain is one of those organs which in trying to attain unity is not yet quite successful, is dogged by its repressed and shady twin, whom however it basely utilises, but who bobs up and claims an identity especially in the more savage and honest of us? I'd love to spend a week-end with one of those semi-decerebrate patients and try to find out.

* * *

The other day Mr. John Hilton spoke on the wireless of the difficulty some service men find in getting lifts from motorists. He suggested many good reasons why motorists do not stop, but he didn't mention ours. Our car was made in 1933. It is a two-seater, and if we are both travelling the only free seat is in the dicky and its seat was made in 1933 too. There is absolutely no protection from draught, which may be piercing even on a hot summer day, and the hold, or whatever it is called, is always filled with an assortment of luggage, books, coats, knitting, and sometimes a bicycle. So far no-one has ever actually refused a lift, but two sailors became sufficiently disillusioned to get out before they reached their destination, and we did not think any less of the senior service for that.

* * *

Few of us care to hobnob with delayed action bombs, and I for one would not wittingly come within barge-pole, much less stethoscope, length of one. Captain Robert Davies, who seems to find them interesting little things, likes to listen to their physical signs, and has now and then borrowed a neighbouring stethoscope to do it. What he detects from the awful noises in their colicky interiors he has not divulged, though it would make good clinical reading. Is there a "Davies sign"—a threatening rub or creak that promises stirring things to come? Does a sinister ticking, like Hook's crocodile, set the listener's hair stirring and send gooseflesh down his spine? The whole proceeding is so madly courageous that one can only gasp and smile. The medical staff of a London hospital has presented him with a stethoscope of his own now, no doubt with the comment, spoken or implied, "Sooner you than me." The whole profession will add a wish that he may never hear anything to his disadvantage.

* * *

When the high-explosive bomb struck the workman's dwelling in a north-west coastal town, it buried young Alfred under the debris. They dug him out and carted him off to hospital, grimy with dust and dirt, shocked, but not seriously hurt. Alfred is fourteen, and when he saw the state of his shirt his comment was, "By gor, an' clean on only this morning." Nicely settled in the ward after a good sleep, he was greeted by the matron on her round, handing out cigarettes where they would be thankfully received. "You won't have one, Alfred, I suppose," she teased him. Alfred looked at the packet of Woodbines in her hand. "Not them," he said, "I'd rather have one of my own. Mine's Capstans."

SCOTLAND

CONFERENCE OF SCOTTISH M.O.H.'S

IN a discussion of war-time public health at a recent meeting of Scottish medical officers of health Mr. W. R. Fraser, secretary of the Department of Health, said that so far they had been lucky in regard to infectious diseases. Apart from some uneasiness last winter regarding cerebrospinal fever there had been no epidemics of major character. They must, however, be on their guard against dangers to health from the inhabitation of shelters, especially as dormitories. Such dangers might arise in Scotland, or epidemics engendered elsewhere might ultimately reach them. In some areas the deaths from tuberculosis had risen, but whether this was on account of war conditions it was too early to judge. Experience of previous wars suggested that a higher incidence of tuberculosis was to be expected. Medical officers must consider what they could do to forestall this danger more successfully than their predecessors. The department had already initiated several measures for general betterment of conditions. Regional agreements between local authorities had been fostered to secure the most advantageous use of infectious-diseases hospitals by the pooling of resources without regard to local boundaries. Local authorities had been asked to arrange for the inspection of air-raid shelters at regular intervals by public-health officers. An exchequer grant of 75% would be made for capital and running costs of additional facilities for the treatment of venereal disease. Local authorities bordering on the Clyde were to come together to discuss ways and means of meeting the problems of sanitary control arising out of the abnormal shipping conditions there. Dr. Mackintosh, chief medical officer to the department, stated that there seemed to be an increase in the personal horrors of war—the louse, the bug, and scabies. The environment for the spread of diphtheria was suitable at the moment and he urged local health authorities to do all in their power to encourage parents to have their children immunised. Of the various methods adopted to encourage immunisation house-to-house canvassing was said to have been the most successful.

NEW BIOCHEMICAL LABORATORY IN GLASGOW

The biochemical laboratory provided by the Glasgow corporation for the Stobhill Hospital was recently opened by Lord Provost Dollan. The scheme has been planned by Prof. Noah Morris, in collaboration with Dr. A. S. M. Macgregor, medical officer of health for Glasgow. At the opening Principal Sir Hector Hetherington said that

the university had had to depend in an increasing degree for many years on the help of the corporation for educating students in infectious diseases and other work which was the special province of the corporation in the field of public health. That one of the university's full-time professors should have his clinical unit in a corporation hospital as distinct from a voluntary hospital was something of an experiment in Glasgow. He expressed the gratitude of the university for the coöperation of the corporation health committee and for the services placed at the university's disposal. Nothing had been so remarkable as the growth in the last 20 or 30 years of the community's sense of responsibility for the physical welfare of its people.

TREATMENT OF CEREBROSPINAL FEVER

THE War Office have amended their advice in the management of cerebrospinal fever so as to incorporate the knowledge of chemotherapy gained during last winter's epidemic of the disease. The routine management of cases and of contacts has been simplified and suggestions for more efficient prophylaxis have been made. Routine postnasal swabbing of contacts for the detection of carriers has been abandoned, and no attempt is made to segregate such individuals, although their identity is recorded. Similarly mass gargling and nasal insufflation on parade is no longer recommended, for no satisfactory evidence of its value has yet been produced. Prophylaxis is furthered by the encouragement of simple lectures to the troops when advice based on the mode of spread of the infections and the part played in it by the nasopharyngeal secretions is given. Open-air exercise is urged and the use of hot, humid and stuffy rooms deplored. In particular, medical officers are advised to make sure that whenever rooms are vacated maximum ventilation is obtained, while during rush hours their occupants should be dispersed as widely as possible, avoiding even temporary overcrowding and contact around fires or in canteen bars. In the barrack-room the centres of beds should be six feet apart at least and every alternate bed should be turned so that each man sleeps with his head opposite his neighbour's feet.

Following recent publications on the treatment of cerebrospinal fever, sulphapyridine is accepted as the drug of choice as it was found more effective than sulphanilamide or sulphathiazole. When either drug is used lumbar punctures are required for diagnosis only and the drainage of the cerebrospinal fluid as a therapeutic measure is necessary only if symptoms such as headache demand it. Should such an occasion arise opportunity should be taken to check the concentration of the drug in the fluid recovered, and every effort should be made to keep this concentration up to 5 mg. of sulphapyridine per 100 c.cm.

Routine treatment follows the lines laid down by recent writers, 8–10 g. of sulphapyridine being given by mouth within the first twenty-four hours, in four-hourly doses, half of this total being given in the first two administrations. After these large initial doses the administration is continued for two days and is then reduced to 2 or 3 g. daily for six days. The total period of treatment should not normally exceed nine days. In spite of its extreme alkalinity the intravenous and intramuscular use of sulphapyridine soluble has not been abandoned in fulminating or unconscious cases. In civilian practice, however, it has been found that sulphapyridine can effectively be given to most of such cases through a nasal or oral tube and that when vomiting occurs substitution of the same dose of sulphanilamide for twenty-four hours brings relief, so that the alkaline sodium salt is fortunately very rarely required.

Lastly, the pamphlet stresses the importance of early administration of the sulphonamides even where bacteriological diagnosis has not been made, and voices the opinion of many a harassed hospital physician by urging that a documentary record of the nature, dose and method of administration of the drug that has been given should accompany the patient to hospital.

Obituary

KATE ANNE PLATT

M.D. LOND.

Dr. Kate Platt, the first principal of the Lady Hardinge Medical College for Women at New Delhi, was killed by enemy action in London on Oct. 13. She was born at Gloucester in 1866, the only daughter of James Platt, M.Inst.C.E. She was educated at Cheltenham Ladies' College, and often accompanied her father on his professional visits to the United States and the Continent before she decided to study medicine. She graduated M.B. from the London School of Medicine for Women in 1904, and for a time held the post of pathologist at the Elizabeth Garrett Anderson Hospital. But soon she went to India, and after working at Poona for a year was appointed medical superintendent of the Victoria Dufferin Hospital in Calcutta. When Lady Hardinge started a medical college at New Delhi for Indian women, she chose Dr. Platt as organiser and first principal. Of her work there a friend writes: "Dr. Platt had already shown herself a capable administrator and successful surgeon, and that the building should be completed and the college and hospital opened in 1916 in the midst of the dislocation caused by the last war was a testimony not only to her strength of purpose and character, but to her shrewd judgment and handling of people. As principal, while insisting on a high standard of work, her sense of humour and artistic gifts enabled her to make life colourful for many people. She held that medical women should not be dowdy, and herself not only was charming but looked it." Dr. Platt also served as adviser to the Countess of Dufferin's fund when the Women's Medical Service for India was started. In 1921 she retired on grounds of ill health and came back to England, but she went on working. She enjoyed lecturing to East-end audiences on social hygiene, she was active in the service of the Marie Curie Hospital at Hampstead, and she served as medical adviser in the recruitment of the Lady Minto Nursing Association for India. But above all her London home was a resting-place for all who had worked in Delhi. Events have moved so quickly in India that it is perhaps already difficult, as her friend justly remarks, to realise how much we owe to pioneers such as Dr. Platt, who enabled purdah women to study medicine and prepared the way for the adequate treatment of Indian women and children by their own countrywomen.

JEFFREY RAMSAY

O.B.E., M.D. LOND., F.R.C.P.

On Oct. 25 Dr. Jeffrey Ramsay died at his home at Longridge from a heart attack. He was born at Heaton Mersey, near Manchester, in 1884, the son of Peter Jeffrey Ramsay, J.P., and was educated at St. Bartholomew's hospital, where he qualified in 1907. The following year he went to Blackburn as house-surgeon at the Royal Infirmary, and after a short absence he returned to settle in the district which he served without stint till he died. Only a few days before his death he had been appointed blood-transfusion officer for the region. During the last war he was a physician specialist at a casualty-clearing station and was twice mentioned in dispatches. He held the rank of lieut.-colonel in the R.A.M.C. (T.R.).

W. A. D. writes: "I first met Jeffrey Ramsay twenty years ago. He was the leading light at the annual meeting of the Blackburn and district nursing association. He was a forceful yet humorous speaker with a merry twinkle in his eye. Acquaintance developed, as in all who had the opportunity, into firm friendship. He was one of the leading practitioners of Blackburn and district, and though then in general practice was an honorary physician of the Royal Infirmary. He was a sound clinician and took the M.R.C.P. in 1925. He was greatly interested in laboratory work and spent long hours at the bench. He gradually dropped general practice and became a consultant. It gave immense pleasure to him as well as to his friends when he was elected to the fellowship in 1937, a rare distinction for a physician working in one of the smaller industrial towns of Lancashire.

"He took a prominent part in the work of the charities of his adopted town, and no one who appealed to him for

a good cause went away empty-handed. He was a whole-hearted supporter of the public-health service and gave much thought to the problems of juvenile rheumatism. He established one of the first clinics in the north of England for the supervision of these sufferers. He dispensed lavish hospitality in his country-house on the Longridge Fell where, after a tramp on the moors, conversation would sparkle on a wide variety of subjects, but with every now and then an affectionate reference to Bart's. He wielded immense influence over a wide area, and his premature death is a great loss to the profession and to the community he served so well."

EDWIN JOSEPH WYLER

M.C., M.D. LOND.

THE death of E. J. Wyler on Oct. 22 took from us a distinguished serologist who for nearly twenty years maintained on behalf of the Ministry of Health the Wassermann standard for this country. This standard operated through the system of comparisons, instituted by Colonel L. W. Harrison soon after the creation of an official venereal diseases pathological service. Sets consisting of some hundreds of sera were examined by Wyler, in parallel with official V.D. and other pathologists, for their behaviour in Wassermann reaction tests. Reports were then made to the pathologists doing the comparison to show to what extent their test technique fell short, either as "too sensitive," thus risking false positives, or "too weak," risking an untimely cessation of treatment as the result of false negatives. The very high standard set by Wyler was borne out by the international contests at Copenhagen in 1923 and 1928 and at Montevideo in 1931, at which serologists from many countries, convened by the Health Section of the League of Nations, examined in parallel sera from large numbers of syphilitic and non-syphilitic subjects. At the two Copenhagen meetings his percentages of positive reactions with syphilitic sera were higher than those of any other Wassermann tester (of those who also gave no false positives). He was therefore chosen to represent Europe at Montevideo, and again reported no false positives and an almost unbeaten level of sensitiveness in the Wassermann reaction.

Wyler's contributions to medical literature were chiefly on this subject, which he had made his own, and the majority appeared as reports either to the Medical Research Council or to the Ministry of Health. His earlier work included four reports to the Colonial Office on yellow fever in Nigeria in 1913.

In 1936 he retired from the service of the ministry, and looked forward to enjoying the arts of music and painting, to which he was devoted. This period of leisure has been too brief; driving his car in apparent health one evening, he was seen to stop by the wayside, and was found dead at the wheel two minutes later.

W. M. S.

ROBERT CYRIL TURNBULL

M.D. LOND.

Dr. Robert Turnbull, who died at Devizes on Oct. 18 at the age of 63, retired from the post of medical superintendent of Severalls Mental Hospital, Colchester, two years ago. He qualified from the London Hospital in 1900, and for some years worked in the London County Council mental hospital service at Horton and Colney Hatch. In 1908 he took his M.D. Lond. in psychological medicine, at that time a rare distinction, and in 1910 he was appointed senior assistant medical officer at the Essex county asylum at Brentwood. Two years later he was promoted to the position of medical superintendent of the new mental institution which was nearing completion under the same authority at Severalls, near Colchester.

This hospital was opened in the spring of 1913, and for over 25 years Dr. Turnbull devoted all his energies to the task of making and retaining its reputation as one of the most successful of its kind in the country. The last war depleted his medical and nursing staffs and overcrowded his wards and frustrated for a time his hopes and ambitions of advancement in methods of treatment. But from 1919 onwards his whole medical administration was one of progress. W. G. M. writes: To Turnbull must be given a due share in changing the outlook of asylums to that of mental hospitals. He was a broad-minded, practical psychiatrist, insisting that mental illness must be attacked from every angle, and his treatment was based on sound clinical observations. He was a pioneer in regard to occupational therapy, physical training and outpatient clinics for mental patients. The standard he set himself was a high one, and he expected the same standard from those who worked under him. He was intolerant of anything mean, petty or not absolutely straight, and he was outspoken in criticism. As a true Yorkshireman he never made hasty decisions, his judgments were well considered and those who knew him best sought his advice. Under his administration Severalls was a happy place for patients and staff. He had a keen sense of humour, a trifle caustic at times, perhaps, but never intended to hurt. His lectures to nurses were enjoyed equally by lecturer and audience, and his juniors will long remember the evening discussions of recent cases.

In his younger days Dr. Turnbull was a keen cricketer —a stubborn, slow-scoring batsman—but in later years his recreations were gardening, chess, golf and fishing, all suited to his thoughtful, contemplative nature. He was a prominent member and past-president of the Colchester rotary club, and he was unobtrusively and practically interested in social problems. His rose-garden contained prize blooms which could hardly be rivalled by any other amateur grower. His home and family life was ideally happy, and it is sad that he has not been spared to enjoy his leisure with the wife who shared his strenuous years. He leaves one daughter and three sons.

JOHN COLIN KEITH CAMPBELL

M.B. CAMB.

Dr. J. C. K. Campbell lost his life in an air-raid on St. Thomas's Hospital. The son of Mr. J. R. Campbell, of Cuilin, Bray, co. Wicklow, he was educated at Haileybury, and Clare College, Cambridge. He took part I of the natural sciences tripos in 1936 and part II of the tripos in pathology the following year. He went on to his clinical work at St. Thomas's Hospital and passed his M.B. degree in June. One of his teachers writes: In Campbell the medical profession has lost a member with the highest, most needed qualities—keen intelligent honesty, a happy vigour and a delicate consideration of his fellow men. His short life has been, and will remain, a benefit to his friends.

JOHN PATRICK BROOKE BALL

M.R.C.S.; LIEUTENANT, R.A.M.C.

THE death of Lieut. J. P. Ball at the age of 26 in an air attack in September is announced. Ball was at school at Eastbourne College and entered Westminster Hospital by way of King's College in October, 1932. He qualified M.R.C.S. last year. He took an active part in the athletics of the medical school, where he founded the squash racquets club. He also played Rugby for the hospital and was an enthusiastic yachtsman.

ERNEST HUGH SNELL

M.D., B.SC. LOND., D.P.H., F.R.S.E.; BARRISTER-AT-LAW

THE death last month is announced of Dr. E. H. Snell, formerly medical officer of health for Coventry. He was born at Chesham in 1865, and was educated at the Universities of Birmingham and London. He qualified from King's College in 1889 with honours in medicine and forensic medicine, and after holding resident posts in Birmingham at the Queen's Hospital and the General Hospital, he returned to London to gain experience in public-health work. He became in turn medical officer for Blackwall Tunnel, assistant medical officer for smallpox ships under the M.A.B., and assistant medical superintendent at Paddington Infirmary. In 1897 he was appointed to his post at Coventry, and in the Midlands he built up a great reputation as an authority on public health. In 1926 he was elected president of the society of M.O.H.'s, in whose counsels he showed outstanding qualities of common sense and a wide knowledge of his specialty, while he presided over their annual dinner with a dry humour which made it a memorable occasion. Apart from his annual reports and his book on Compressed Air Illness, he was not a prolific writer. He retired in 1927, but continued to live in Coventry.

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Medical News

University of Cambridge

On Nov. 2 the following degrees were conferred :—

M.B., B.Chir.—* M. O. J. Gibson, and * C. F. H. Wiessner.
M.B.—* Sir Ivor Beauchamp and L. J. Bacon.

* By proxy.

Royal College of Physicians of London

At a meeting of the college held on Oct. 31, with Sir Robert Hutchison, the president, in the chair, Dr. Henry MacCormac, Dr. Hope Gosse, Dr. R. A. Rowlands and Dr. Robert Coope were elected councillors. Dr. A. Clark-Kennedy was elected representative of the college on the committee of management of the Conjoint Board. The president announced the award of the Jenks memorial scholarship to Gerald Rees Davies, late of Epsom College, and the appointment of Dr. W. N. Pickles as Milroy lecturer for 1942.

Isaac Muende, M.B. Lond. was elected a member. Licences to practise were conferred upon 182 candidates (159 men and 23 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the college. The following are the names of the successful candidates :—

R. H. Alexander, S. M. Ali, W. H. E. Allen, J. L. B. Ansell, O. B. Appleyard, D. J. Ap Simon, W. D. Arthur, P. A. Bachmann, C. F. Ballard, P. S. Barclay, R. C. Barclay, Alexander Barlow, E. D. Barlow, K. L. Barnes, Robert Bauer, G. W. Bellis, F. D. Birks, Robert Boggon, J. F. Bourdillon, Ruth E. M. Bowden, P. T. Boyle, J. V. Braithwaite, B. D. Burns, J. S. G. A. Burns, Walter Calvert, A. H. Campbell, E. C. R. Campbell, W. R. Clarke, D. P. Cocks, P. W. S. Coghill, L. B. Cohen, R. H. L. Cohen, M. J. Conlon, O. L. C. Cookson, G. O. Cowdy, A. S. Craner, Leonora A. Crawford, Barbara M. Crook, Muriel Crouch, Timothy Culloty, David Dangerfield, H. M. Darlow, J. O. Davies, Grace T. Dawson, W. G. Daynes, H. E. H. Denham, R. V. Dent, George Discombe, P. C. Dismorr, D. M. L. Doran, R. E. Dunn, J. G. Eadie, T. E. C. Early, A. H. A. El-Baghdadi, John Faiq, A. G. Farr, J. B. Fawcitt, M. A. Fawkes, J. M. Ferguson, J. R. Fletcher, D. C. Fraser, D. N. Fuller, Laurence Garrett, Basil Godwin, Harry Greenberg, Saul Gruber, J. P. Guthrie, K. A. Hall, R. S. B. Hamilton, F. W. Hanford, G. I. Harding, J. S. Hesketh, C. R. F. Hewlett, Dorothy M. Hicks, R. T. Hinde, H. D. R. Hine, G. S. Hopkins, E. V. Hope, Gordon Houseman, W. G. J. Hughes, S. O. Hunt, A. D. Husband, D. M. Jackson, F. S. Jackson, Muriel E. James, B. D. L. Johnson, G. A. Johnson, F. T. Jones, J. G. Jones, P. E. H. Jones, Mostapha Kamill, J. G. Koopman, Gerardus Krafft, Denys Laing, P. W. W. Leach, Cynthia Lee, J. B. Lee-Woolf, Flora Levy, Delfun Lewis, T. D. C. Lewis, Max Lipsitz, G. B. Locke, W. J. C. Lord, R. E. McLachlan, Alastair Maconochie, J. M. Malins, Antony Maples, W. W. Marsden, D. V. Martin, D. H. Meldrum, S. P. Millar, R. P. Mills, D. T. Milnes, S. N. Mohan, E. H. Moorhouse, J. E. Morgan, P. S. Norris, Ruth P. Peterson, H. T. Phillips, Florence R. Pillman, G. W. Pinder, J. M. Piney, J. F. Poolman, D. S. Porter, Mangadu Rathnavelu, M. A. Rauf, A. H. Rea, Lucien Read, R. D. S. Rhys-Lewis, Joseph Ribeiro, B. G. Rigden, P. A. L. Roberts, G. M. Robson, J. W. Rogerson, Joan A. Rosmarin, C. M. H. Rotman, T. W. Rowntree, C. A. Royde, R. S. Russell-Smith, Mary M. E. Rutter, Kate E. Rymer, J. E. Ryner, James Salwey, A. R. Sandford, C. A. Sandle, C. F. Saunders, Nathaniel Saunders, Edmund Shephard, Harry Shloimovitz, A. R. Silcock, Margaret C. Smith, Peter Smith, A. J. H. Spafford, Kathleen Staynes, J. M. Steinberg, John Stuppel, Myra Sutherland, Norman Swallow, J. F. Swan, P. H. Tasker, D. M. E. Thomas, D. T. Thomas, E. G. Thomas, H. A. Thomas, Beatrice M. Thompson, William Thomson, Ahmed Toorawa, N. C. B. Trapps, P. D. Trevor-Roper, Richard Wadia, Violet E. Waller, Mary J. Walmsley, Patrick Waters, W. F. J. Weston, C. L. Wharton, H. W. Wheate, M. W. L. White, J. H. Wildman, Mary U. Wilkin, J. M. Williams, T. N. P. Wilton, and John Woodley.

Diplomas in child health were conferred, jointly with the Royal College of Surgeons, upon those mentioned in THE LANCET of Oct. 19, p. 505, and diplomas in public health upon the following :—

S. D. Arya, B. C. Barua, Mary T. Day, J. M. Gray, Ibadulla Kitchlew, M. W. A. Quraishi.

Hospital Planning in Scotland

The Scottish medical advisory committee to the Nuffield Provincial Hospitals Trust mentioned in our Scottish letter last week will include :

Sir John Fraser (chairman), Prof. J. R. Learmonth, Prof. Noah Morris, Prof. C. F. W. Illingworth, Prof. Charles McNeil, Prof. James Hendry, Prof. Adam Patrick, Dr. J. Crawford Knox, Dr. W. G. Clark, Prof. J. M. Mackintosh, Dr. A. Greig Anderson, Dr. Duncan Leys, Dr. R. W. Craig, and Dr. A. S. M. Macgregor.

Sir Girling Ball has been elected dean of the faculty of medicine in the University of London for 1940–42.

A meeting of the Pharmaceutical Society of Great Britain will be held at 17, Bloomsbury Square, London, W.C.1, on Nov. 14, at 2.30 P.M., when Prof. Alexander Fleming will give an address on antiseptics in war-time surgery.

The military cross has been awarded to Flying Officer C. B. J. Wylley, B.M.

Flying Officer Wylley was buried in the debris of a building which received a direct hit during an intensive air raid on an aerodrome. In spite of slight injuries and shock, this medical officer immediately rendered first aid to other injured personnel.

W.S./Captain N. R. Lansdell, R.A.M.C., previously reported missing, is now reported prisoner of war.

Colonel E. M. Cowell, A.M.S., has been promoted to the rank of brigadier. He is the first medical man to hold this rank.

A meeting of the Royal Society of Arts will be held at John Street, Adelphi, W.C.2 at 1.45 P.M., on Nov. 27, when Mr. A. Dickson Wright will speak on the treatment of wounds.

The examination for the Theodore Williams Scholarship in Pathology will be held in the University of Oxford, to-day, Saturday, Nov. 9, and not on Nov. 10 as previously announced.

At the quarterly meeting of the directors of the Naval Medical Compassionate Fund, held on Oct. 29, with Surgeon Vice-Admiral Sir Percival Nicholls, medical director-general of the Navy, in the chair, the sum of £154 was distributed among the several applicants.

The Dudley Medical War Committee have nominated Dr. Ellis Taylor, assistant school medical officer, for service in the forces. The local education committee have refused to release him until they have found a suitable successor. Dr. Taylor is responsible for some 7000 children, and the committee feel that it is not in the national interest that this work should be allowed to suffer. The committee are advertising the post.

Births, Marriages and Deaths

BIRTHS

AVERY.—On Nov. 2, at Kota Bharu, Malaya, to Dr. Ursula Avery (*nee* Jeffery)—a son.
BASKETT.—On Oct. 26, in Edinburgh, the wife of Lieutenant Noel Baskett, R.A.M.C.—twins, a son and daughter.
CHAPPEL.—On Nov. 2, at Minehead, the wife of Dr. H. M. Chappel—a son.
CLARKE.—On Oct. 29, at Oxford the wife of Dr. E. P. Clarke—a daughter.
DEACON.—On Oct. 29, the wife of Dr. John Nissen Deacon, of Edgware—a son.
HORGAN.—On Oct. 26, at Tralee, the wife of Mr. Michael Horgan, F.R.C.S.—a son.
JENNINGS.—On Nov. 3, at Reading, the wife of Dr. L. M. Jennings—a daughter.
KNOWLES.—On Oct. 27, at Petersfield, the wife of Major A. H. Knowles, R.A.M.C.—a daughter.
LEEDHAM-GREEN.—On Nov. 2, in Edinburgh, the wife of Major J. C. Needham-Green, R.A.M.C.—a son.
SHOVE.—On Oct. 26, the wife of Dr. Russell Shove, of Cullompton—a son.
TUCKWELL.—On Nov. 2, at Puttenham, the wife of Mr. E. G. Tuckwell, F.R.C.S.—a daughter.

MARRIAGES

DICK—COLVILL.—On Oct. 30, at Campbeltown, Argyll, Henry Paul Dick, M.R.C.S., surgeon lieutenant, R.N.V.R., son of Dr. F. A. Dick, of Walton-on-the-Hill, to Nancie Colvill.
ELLIOTT—ELKINTON.—On Oct. 30, in London, Frank Abercrombie Elliott, M.R.C.P., to Betty Kathleen Elkinton.
GRAHAM—RUSSELL.—On Nov. 3, at Blundellsands, George Desmond Graham, M.R.C.S., to Evelyn Ann Russell.

DEATHS

COLTART.—On Nov. 4, in a railway accident, John Gilchrist Coltart, M.B. Glasg., and his wife.
CROSS.—On Oct. 29, at Sidmouth, Francis George Cross, F.R.C.S.
FITZGERALD.—In October, by enemy action, Desmond FitzGerald, M.R.C.S., and his wife.
SPENCER.—On Oct. 29, Walter George Spencer, O.B.E., M.S. Lond., F.R.C.S., aged 82.

Appointments

GOODING, S. E. F., M.D. Camb.: part-time M.D. for civil defence for Surbiton.
LOGAN, H. A., M.B. Belf.: examining factory surgeon for Altrincham, Chester.
MACDONALD, F. G., M.R.C.S., D.P.H.: asst. V.D. officer for Durham and Northumberland with Gateshead and Newcastle-on-Tyne.
MAGAURAN, W. H. B., M.D., M.Ch. N.U.I., F.R.C.S.: temp. consultant to the ear, nose, and throat department of the King Edward Memorial Hospital, Ealing.
OWEN, E. TUDOR, M.B. Lpool: junior R.S.O. at the Christie Hospital and Holt Radium Institute, Manchester.

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ORIGINAL ARTICLES

MASS RADIOGRAPHY IN PRACTICE

By FREDERICK HEAF, M.D. Camb.
PRINCIPAL ASSISTANT MEDICAL OFFICER, LONDON COUNTY COUNCIL

THE object of mass radiography is to discover cases of pulmonary tuberculosis by submitting large numbers of the population to X-ray examination. It should not be considered as a means of determining the incidence of tuberculosis but as an instrument for combating the spread of infection by revealing the hidden active cases among the apparently healthy population. Indeed, as far as the general public are concerned it should be dissociated from tuberculosis and made an examination for general fitness. This would stop a person thinking that because he had passed a test for tuberculosis at one time therefore the disease could not be the explanation of symptoms which developed later.

Mass radiography to be effective must be carried out on an extensive scale. This means provision of services to deal with those whose radiogram is not normal. Judging from the literature about 1·5% of those examined will be found to be suffering from pulmonary tuberculosis, while perhaps 4% will show abnormal shadows. If only 5% of the population of London is examined a more detailed investigation will therefore have to be made in something like 10,000 cases. Re-examination will also be necessary and the number of cases discovered will not decrease for some years until a high proportion of the population between 15 and 50 have been examined.

CLASSIFICATION

It is of little use merely to tie labels on to people which will stimulate morbid fears without helping them to meet the new circumstances. A scheme must therefore be developed concurrently to deal with those found to have abnormal chests.

Mass radiology will divide those examined into people with radiograms within normal limits and those whose radiograms show significant shadows. Doubtful cases and those with peculiar shadows will have to be put aside for detailed clinical and radiographic examination. These cases may need some beds at a diagnostic centre or they may attend as outpatients a well-equipped clinic. They will certainly throw a considerable amount of extra work on chest hospitals and dispensaries.

Where the radiographic shadows are due to tuberculosis the lesions may be classified as follows :—

1. *Cases with active lesions* should be recognised at the first examination or at the second after a short interval. Most of these patients will need sanatorium routine for a period, but a small percentage will be able to receive domiciliary treatment if their environment is suitable and adequate medical supervision is available. In the minimal-lesion cases it is important that the patient receives sufficient treatment to arrest the disease without creating that shyness for work which sometimes follows the enforced idleness of a sanatorium. As soon as possible the patient should be usefully employed under medical supervision.

2. *Cases with latent lesions* are and always have been symptomless but radiographic shadows indicate pulmonary infiltration which may at any time increase or produce symptoms of activity.

3. The *early quiescent case* has had a history of symptomatic pulmonary disease with indefinite or very slight radiographic changes and at the time of examination shows no signs of activity.

Both groups 2 and 3 feel well and in their own estimation they are normal and healthy. To put them in an institution would be a psychological, medical and economic mistake, yet they are all potential cases of active pulmonary tuberculosis and need close observation. Periodic medical and radiological examinations will not prevent a breakdown in their health. It is essential to eliminate predisposing causes of tuberculosis in their life. Machinery already exists for dealing with housing and extra nourishment, but there is no satisfactory organisation for the control of leisure and the finding of suitable employment. The Ministry of Labour, operating in conjunction with the Ministry of Health on a regional basis, could give valuable help in the redistribution of those requiring special employment. Existing training centres might be used for those needing training or they might be dealt with by the national rehabilitation board which has been suggested. Whatever scheme is adopted it must not in any way cause these apparently healthy people to consider themselves invalids or substandard workers.

4. The *advanced quiescent case* has a past history of symptoms of pulmonary tuberculosis and there are definite and usually fairly extensive radiographic changes due to tuberculosis but there has been no indication of activity for a considerable period. In these people the risk of breakdown is greater and they need medical supervision and sheltered conditions of employment such as are to be found in the village settlement.

NOTIFICATION

Of the four groups into which the cases have been divided no argument against the notification of those suffering from active tuberculosis can be raised. But difficulties begin with the apparently healthy groups who are not suffering from active tuberculosis. With proper treatment it is hoped that most of them will never develop active lesions. They should therefore not be notified as cases of tuberculosis but placed on a supplementary register (as suggested by Fowler of Pinewood Sanatorium) which can be revised at the end of each year. If clinical evidence of active tuberculosis appears the name would be automatically transferred to the permanent register and the case notified. Every care would have to be taken that people on the supplementary register escaped the disadvantages of being thought to suffer from tuberculosis. The visiting of homes and investigation of financial circumstances and conditions of employment should be carried out not by the staff of the tuberculosis dispensary but by social-welfare workers, the public-assistance department or the suggested rehabilitation board.

RÔLE OF THE TUBERCULOSIS DISPENSARY

The best results from mass radiography will be obtained if the dispensary is regarded as an essential part of the scheme, ready to deal with the cases of active tuberculosis but not itself concerned with the organisation or management of the survey. Most of the people with abnormal radiograms will have no sputum or other symptoms of tuberculous activity and they need only be observed at intervals at centres not directly connected with a dispensary. These centres might either be part of the welfare schemes of large industrial firms or directly connected with a body forming a liaison between the Ministry of Labour and the Ministry of Health. All the films taken at the centre would have to be reviewed by an authority on disease of the chest with special knowledge of tuberculosis, assisted by a radiologist with similar qualifications and the tuberculosis officer of the area. Where the diagnosis is doubtful further investigations must be made at a hospital equipped for the purpose, and only when the case is confirmed as active tuberculosis should it be transferred to the care of the dispensary.

SOCIAL IMPLICATIONS

Some of the repercussions of mass radiography on life insurance and employment have already been discussed in the correspondence columns of THE LANCET.[1] Radiography is a more searching form of medical examination than those at present required for life insurance or employment carrying superannuation. What will be the position of the apparently healthy person with an abnormal chest radiogram ? To safeguard his interest the review of the films should not be left to one doctor, but be submitted to a board of three whose unanimous opinion must be obtained before insurance companies, state or municipal services or similar concerns accept

1. *Lancet*, Aug. 24, 1940, p. 246 ; Sept. 7, p. 309 ; Sept. 14, p. 343.

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the diagnosis. From the statistics published 25% of those with abnormal radiograms are found to have active lesions. The abnormalities shown by the other 75% may or may not be clinically significant. Their ultimate prognosis is of importance to those concerned with assessing the probability of life.

BEDS AND FINANCE

Extra beds will be needed for people with abnormal radiograms, but every effort should be made to avoid inpatient investigations and treatment. Some patients will need sanatorium care, but there should be ample accommodation for them after the war in the beds now being used by the Emergency Medical Service. It should not be necessary to consider the suggestion made in Germany,[2] where mass radiography has been practised, of combing out the inmates of children's institutions to release beds for adults. Besides the administrative difficulty of converting institutions for children into adult accommodation the principle is bad for it would mean stopping the treatment of some children which was producing good results. A heavier demand will probably fall on beds for observation and diagnosis at the general and special hospitals, but even here much would be done by extending the facilities for investigation in the out-patient department. More staff will no doubt be required to deal with the increased number of patients.

Once the diagnosis of active tuberculosis has been established the patient comes under the tuberculosis scheme of his local authority, but till then he should be protected from the drawbacks which attend association with the disease, and investigations should if possible be carried out at the mass radiography centre or the out-patient department of a general hospital. The number of recommendations for inpatient treatment will also be limited by the reluctance of examinees, many of whom will probably feel fit and well, to accept hospital or sanatorium treatment. The public will not coöperate in a scheme which is likely to intern them in an institution.

Money will be needed to establish centres for mass radiography, apparatus will have to bought and specialist staff engaged at good salaries. The cost of maintaining the centres will not be great but the initial outlay may be considerable. Industry will receive the main benefit from the scheme in an improved general standard of health of the workers and it is reasonable to suggest that it should subscribe largely to the inauguration of the survey. Contributions from firms who are interested could be controlled by the national rehabilitation board who would be responsible for the examination of their employees. Local authorities under the Ministry of Health would take over cases needing treatment and public-assistance departments might help with training people for suitable occupations.

CONCLUSIONS

Mass radiography will assist in controlling the spread of tuberculosis. The scheme should be presented to the public as part of a general fitness campaign rather than a search for cases of tuberculosis.

An organisation for the rehabilitation of the abnormal cases discovered must be promoted. Inpatient observation and treatment must be avoided where possible and every effort made to prevent invalidism developing. Attention, therefore, should be given to the domestic environment, employment, leisure and daily routine of those whose chests show lesions which are or may be of clinical significance.

The diagnosis of chest lesions discovered by mass radiography may have far-reaching consequences, and doubtful cases should be submitted to a board of three specialists of whom the tuberculosis officer should be one.

Sufficient accommodation should be available after the war for the observation and treatment of active cases in the beds now under the E.M.S.

Investigations into domiciliary conditions and employment, training in suitable occupations, and redistribution of labour might be under the management of a national rehabilitation board forming a liaison between the Ministry of Health and the Ministry of Labour, and the main survey itself might be taken over by some such body assisted by industrial organisations. Cases needing care due to the presence of tuberculosis would be handed over to the public-health authorities for observation and treatment.

Since the main benefit of the scheme would fall to industry, industrial concerns should help financially in the inauguration and maintenance of the scheme, while the treatment and part of the rehabilitation costs might be borne by the local authorities under the Ministry of Health.

I should like to thank Dr. Allen Daley, medical officer of health of the London County Council, for permission to publish this paper. The suggestions it contains are not necessarily the policy of the council but are my own personal views.

2. Clare, K. *Lancet*, Jan 20, 1940, p. 155.

TRACTION LESIONS OF THE EXTERNAL POPLITEAL NERVE

BY HARRY PLATT, M.D.Manc., M.S.Lond., F.R.C.S.
PROFESSOR OF ORTHOPÆDIC SURGERY IN THE UNIVERSITY OF MANCHESTER; ORTHOPÆDIC SURGEON TO THE ROYAL INFIRMARY

ONE of the more serious but relatively uncommon forms of violence to which the knee-joint is exposed is a sudden and powerful adduction of the leg on the thigh. The essential injury produced by this mechanism is an extensive rupture of ligamentous structures on the lateral aspect of the joint, sometimes associated with a temporary subluxation. In exceptional circumstances, when other forces, such as torsion and hyperextension, are combined with adduction, the knee-joint may be completely dislocated. Under such violence it is not surprising to find that the external popliteal nerve shares in the damage and is either overstretched or even completely torn across. Nine examples of traction lesions of the external popliteal nerve produced in this manner have come under my care during the past twenty years (see table). The circumstances in which the injuries were sustained were as follows:—

Industrial accidents	4	Sport (pheasant shooting)	1
Road traffic accidents	3	Games (rugby)	1

ILLUSTRATIVE CASE-RECORDS

CASE 2.—A man, aged 32, met with an accident while shooting pheasants on Jan. 26, 1924. He caught his right heel in the ground and fell forwards, putting a sudden powerful adduction strain on his knee-joint. Immediate examination showed an obvious rupture of the ligaments on the outer side of the knee, with angular deformity. This was promptly reduced by a medical man in the party. Some hours later, drop-foot was noted. Three days later the right tibia was abnormally movable on the femur. There was no effusion and no pain. There was a complete motor and sensory palsy of the external popliteal nerve.

Operation.—On Feb. 11 the right external popliteal nerve was explored, and it was found that the biceps had been avulsed from the head of the fibula; the lateral capsule had been ruptured close to the tibial margin; the external lateral ligament had been torn and the external popliteal nerve completely ruptured.

The proximal end of the external popliteal nerve was tapering and entangled in the avulsed tendon of the biceps. The distal stump, discovered only after a prolonged search, was closely adherent to the torn lateral capsule, almost in the middle line. From this level the distal nerve trunk ran downwards and backwards to pass under the peroneus longus. After the proximal and distal trunks had been widely freed so that the large gap could be closed, the ends were trimmed, and the nerve was sutured under moderate tension, with the knee-joint flexed to 90°. Repair of the torn capsule and external lateral ligament and reattachment of the biceps tendon to the fibula completed the operation.

Subsequent course.—The first signs of recovery of function—a recession in the area of protopathic loss and a quiver in the extensor longus digitorum muscle—appeared seven months after the repair of the nerve. Thence onwards there was steady recovery, and in November, 1925—a year and nine months after the operation—the patient, a regular Army officer, was passed as physically fit to enter the Staff College. All the muscles supplied by the external popliteal nerve were

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then acting with considerable strength, and the knee-joint was stable, with a full range of mobility.

End-result.—In May, 1938—fourteen years after the operation—Dr. Geoffrey Williams, of Wrexham, who had reduced the subluxation of the knee at the time of the original accident, reported that there was a complete motor and sensory recovery, with perfect function in the knee-joint.

CASE 5.—A man, aged 29, had an accident on Dec. 21, 1930, while playing rugby football. His right knee was forcibly twisted in a tackle and completely dislocated. The dislocation was not reduced until two hours after the injury; during that time the patient experienced intolerable pain in his foot, which became swollen and dusky. A few days later, patches of gangrene appeared, involving the whole of the little toe, the under surface of the tips of all toes, and the skin under the heads of the metatarsals. A complete external-popliteal paralysis was noted from the beginning.

Six weeks later there was a fixed flexion contracture of the right knee-joint, with a complete external-popliteal lesion and a partial internal-popliteal palsy. There were gangrenous patches on the foot in the areas described above. At this time the patient was experiencing continuous and agonising pain in the foot, with extreme hyperæsthesia (causalgia).

Operation.—On Feb. 10, 1931, the right external popliteal nerve was explored and sutured end to end. The biceps tendon was unrecognisable. The nerve had been completely ruptured, the proximal end being incorporated in the remains of the biceps, and the distal end embedded in the scar at the site of the old rupture of the lateral capsule. A thin fibrous cord was traced from the proximal to the distal stump. Resection and end-to-end suture was performed, with the knee in full flexion.

Subsequent progress.—The gangrenous areas ultimately separated. The first sign of recovery of external-popliteal function was seen after seven months. At the end of a year there was brisk action in the extensor longus hallucis and extensor longus digitorum muscles, with some recovery of protopathic sensibility. An equinus deformity of the foot and flexion contracture of the knee of 30° were, however, still present.

Second operation.—Seventeen months after the nerve suture the contractures were corrected by a subcutaneous elongation of the tendo Achillis and by division of the posterior capsule of the knee and hamstring tendons.

End-result.—Seven years later the patient walks without a limp and with all external popliteal muscles acting powerfully. There appears to be full recovery of sensation, but accurate sensory tests are somewhat difficult to carry out, because the foot has remained exceedingly hypersensitive, particularly under the metatarsal heads, where the soft part covering is very thin. There is a full range of flexion and extension of the knee-joint, with complete stability.

CASE 6.—Male, age 20, caught his leg in some machinery. He was admitted to hospital in February, 1933, with a complete dislocation of the right knee, which was reduced without delay. Foot-drop was noted several days later. After-treatment: fixation of knee for four months.

Seven months after the injury there was full range of movement of the knee-joint with some lateral instability, and motor and sensory signs of complete external-popliteal lesion.

Operation.—On Sept. 22, 1933, the right external popliteal nerve was explored and sutured end to end. The biceps tendon was found to have been avulsed and the fibular styloid was lying inside the lateral compartment of knee, embedded in dense scar tissue. The external popliteal nerve was completely ruptured; its proximal end was fused with remains of the biceps tendon; its distal stump was in the outer compartment of the knee; and the nerve trunk ran downwards and backwards to the region of the neck of the fibula. The nerve was sutured end to end under moderate tension.

Subsequent course and end-result.—Three years and four months later there were signs of a complete external-popliteal lesion, motor and sensory. The patient is working as a labourer, wearing a drop-foot appliance. There is a full range of movement of the knee-joint, with slight lateral instability. There is complete failure of regeneration of the nerve.

SUMMARY OF CASE-RECORDS

Case	Nerve lesion	Knee-joint lesion	Operation on nerve	Result
1 (1921)	Nerve intact; hæmorrhagic staining of sheath	Not recorded at the time of the accident	Exploration after 5 weeks	Incomplete recovery; sensory recovery complete; motor recovery partial
2 (1924)	Complete rupture	Subluxation of knee reduced promptly; rupture of lateral capsule; external lateral ligament; avulsion of biceps	End-to-end suture after 16 days	Perfect recovery of motor and sensory functions
3 (1925)	Complete lesion; proximal neuroma connected to distal trunk by fibrous cord	Detachment of fibular styloid (fig. 1)	Resection and suture after 2 yrs. and 8 months	Complete failure
4 (1926)	Complete rupture	Rupture of lateral capsule; avulsion of fibular styloid	End-to-end suture after 3 months	Partial recovery of motor and sensory functions
5 (1931)	Complete rupture	Complete dislocation of knee-joint; avulsion of biceps; compression of popliteal artery; gangrene of toes	End-to-end suture after 6 weeks	Complete recovery
6 (1933)	Complete rupture	Complete dislocation of knee-joint; avulsion of biceps; styloid process of fibula in outer compartment of joint	End-to-end suture after 7 months	Complete failure
7 (1936)	Nerve intact; no macroscopic lesion	Rupture of lateral capsule and lateral ligament, fibular styloid	Exploration after 6 weeks	Perfect recovery
8 (1937)	Nerve intact; no macroscopic lesion	Rupture of lateral capsule and of external lateral ligament, with avulsion of fibular styloid	Exploration after 7 weeks	Complete failure
9 (1939)	Nerve intact	Rupture of lateral capsule and external lateral ligament, with avulsion of margin of tibial tuberosity and fracture of neck of fibula	Treated conservatively	Complete recovery in 4 weeks

MORBID ANATOMY

Knee-joint.—The operation and clinical findings in the series of cases here recorded show that the injuries due to abduction alone present a characteristic triad of lesions: (1) rupture of the lateral capsule close to the margin of the tibia, producing a large hiatus on the outer side of the joint; (2) avulsion of the styloid process of the fibula, carrying with it the insertion of the external lateral ligament (fig. 1); and (3) avulsion of the biceps tendon from its fibular attachment. In the two cases of complete dislocation of the knee-joint the injury to the capsule was obviously more extensive and was accompanied no doubt by rupture of the crucial ligaments.

Nerve.—The nerve lesions fall into two groups: (1) four cases of over-stretching without loss of continuity; and (2) five cases of complete anatomical rupture.

(1) *Over-stretching.*—In the three cases in which the nerve was explored—all within eight weeks of the accident—the nerve trunk was intact, with little or no naked-eye evidence of any lesion (cases 1, 7, and 8). The failure of recovery in cases 1 and 8 clearly indicates, however, that the microscopic damage to axis-cylinders must have been serious. In the one case treated conservatively (case 9), despite violence sufficient to produce a typical rupture of capsule and ligament, the nerve sustained little more than a transitory concussion.

(2) *Complete rupture.*—In the five cases of complete rupture of the nerve trunk the findings at operation enable a clear picture to be reconstructed of the sequence of events in this

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uncommon type of nerve injury. It appears that the nerve trunk is usually torn across above the level of the neck of the fibula and distal to the origin of the lateral cutaneous branch. Immediately after the rupture the proximal end retracts with the avulsed biceps tendon, with which it becomes incorporated in a mass of scar tissue at a later stage. In some instances it is evident that the nerve trunk is momentarily forced into the outer compartment of the knee, as shown by the discovery of the distal stump in the scar tissue at the site of the tear in the lateral capsule in cases 2, 5, and 6 (fig. 2).

In case 6 the wedge of scar tissue projecting into the joint contained the shrunken remains of the fibular styloid. The entry of the external popliteal nerve and a bony fragment into the knee-joint is the counterpart of the much better-known injury in the region of the elbow—namely, the inclusion in the joint of the internal epicondyle accompanied on occasion by the ulnar nerve after a subluxation or dislocation. Case 3, in which the course of the nerve trunk was undisturbed, presented a familiar type of nerve lesion consisting of a proximal neuroma connected to the distal stump by a slender fibrous cord.

RESULTS OF TREATMENT

Over-stretching of nerve.—In the three cases in which the nerve was explored the operation played no part in determining the speed or quality of the recovery; for in no case was it necessary to release the nerve from the constricting or restraining effects of scar tissue. The information obtained by direct inspection of the lesion, a method which in graver types of nerve injury is often of considerable prognostic importance, in two cases proved to be misleading in this respect.

The quality of the regeneration in the three patients operated on varied widely. In all three the nerve trunk showed little or no evidence of macroscopic damage; but, whereas in one case there was complete recovery of motor and sensory functions, and in another, examined seventeen years after the operation, recovery was still incomplete, in the third the result was a total failure of regeneration. The main cause of failure lies in the degree of irreparable damage sustained by axis-cylinders in the interior of a nerve trunk which showed no alteration in calibre or consistency. Similar results are not uncommonly seen in traction injuries of the brachial plexus. In such circumstances no form of treatment, conservative or operative, can appreciably influence the ultimate degree of recovery.

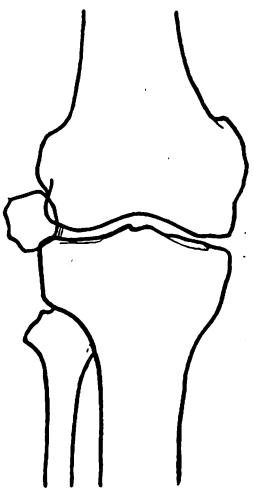

FIG. 1—Tracing of radiogram showing detachment of fibular styloid with displacement upwards to the level of the knee-joint.

Complete rupture of the nerve.—Of the five cases of nerve suture two were complete failures, one showed an incomplete recovery, and two showed complete restoration of both motor and sensory functions—one of them (case 2) being a perfect recovery. In the two cases of complete recovery, although the nerve lesion was most extensive and the nerve suture carried out under conditions of extreme difficulty, the periods of delay between the date of the accident and the operation were very short—sixteen days and six weeks. In the case showing partial recovery (case 4)—also a typical severe lesion but a less difficult operation—the period of delay was three months. In the two complete failures there were longer periods of delay—seven months in case 6, and two years and eight months in case 3, where a less severe type of lesion was repaired without special difficulty. Although here again the influence of the unknown factor—i.e., the degree of intraneural damage to axons in the proximal part of the nerve trunk—cannot be discounted, these cases illustrate the well-established fact that early repair in a complete nerve lesion is of paramount importance in determining the quality of regeneration and its consequent value in terms of motor and sensory function.

The injury to the joint.—The excellent function regained by the knee-joint is a striking feature in all the cases in the series and is particularly notable in the two cases of complete dislocation.

SUMMARY

In severe injuries of the knee-joint due to adduction of the leg on the thigh the external popliteal nerve is liable to be overstretched or completely torn across.

The injury to the knee-joint resulting from forcible adduction consists of rupture of the lateral capsule close to the tibial margin, avulsion of the biceps tendon, and avulsion of the external lateral ligament, carrying with it the fibular styloid. Exceptional violence may cause a complete dislocation of the knee-joint.

Cases are described illustrating the typical combination of a traction lesion of the external popliteal nerve and injury to the knee-joint. Of the nerve lesions four were examples of over-stretching without loss of continuity, and five were complete ruptures treated by end-to-end suture.

The nerve sutures performed after a delay of three months and longer gave disappointing results. In traction lesions of this type the injured nerve should therefore be explored within the first few weeks of the accident.

In exploring the graver types of complete rupture the distal part of the nerve trunk should be sought in the region of the tear in the lateral capsule.

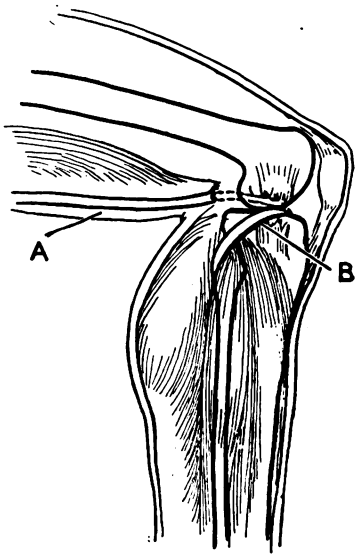

FIG. 2—Diagram of traction injury to the external popliteal nerve in adduction injury to the knee-joint (rupture of lateral capsule, external lateral ligament, and biceps tendon), showing entry of nerve into knee-joint through a gap in the lateral capsule: A, proximal end of nerve; B, distal end of nerve.

NOTE

I have cited several cases in this series in earlier papers on peripheral-nerve injuries (*J. Bone Jt Surg.* 1928, **10**, 403; *Proc. R. Soc. Med.* 1937, **30**, 863). The present communication was read at a meeting of the Society of British Neurological Surgeons three years ago. At that time a search through the literature failed to reveal any previously recorded description of the anatomy of the "ligamentous-peroneal nerve" syndrome characteristic of adduction injuries of the knee-joint.

AMERICA has decided to increase her armed forces under a system of compulsory selection. In the last large recruitment in 1917 out of every 5 or 6 men examined medically for the army 1 was later found to be unable to serve on account of some economic or domestic difficulty. This time it is proposed that the men shall not go up for their medical examination till they have been passed by a board composed of their neighbours empowered to determine their liability for service. A hundred induction boards are being set up to carry out the medical examination, and on each there will sit an orthopædist, a general surgeon, three internists, two ophthalmologists, a clinical pathologist and a dentist. Radiograms of the chest will only be made in doubtful cases, but after the men are in camp a radiological examination of each recruit will be made.

Colonel Charles B. Spruit, medical adviser to the joint Army and Navy Selective Service Committee, who describes the arrangements in two recent issues of the *J.A.M.A.* (Sept. 18, 1940, p. 1105, Oct. 5, p. 1201), points out that as the men are being called to military services at personal sacrifice members of the boards should be willing to serve voluntarily and it is unlikely that compensation will be offered to them.

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PNEUMOCOCCAL MENINGITIS SINCE THE INTRODUCTION OF M. & B. 693

BY F. H. COLEMAN, M.B. Camb., M.R.C.P.
SQUADRON LEADER, R.A.F.V.R.

I HAVE summarised in tabular form most of the published cases of pneumococcal meningitis treated with sulphapyridine, and I report 2 of mine.

The sodium salt of the drug, available for intramuscular or for intravenous injection, is particularly useful in these cases, where oral administration often presents great difficulty. There were 9 fatal cases in the series of 27, including the 3 oldest and 3 of the 4 youngest patients. Of the 3 infants who died 2 had a primary focus of infection in the chest, and 1 in the nasopharynx. The duration of the symptoms before the start of treatment might have been expected to affect the outcome, but those patients with the longest histories, except case 12, survived and did remarkably well. On the other hand, case 15, with a twelve-hours' history, died soon after admission. This was evidently an instance of the fulminating type, and autopsy revealed tenacious mucus in the bronchi and congestion of the bases of the lungs besides generalised lymphatic hyperplasia.

The time required for the cerebrospinal fluid (C.S.F.) to become sterile varied considerably, but in 13 of the cases it was four days or less. A sterile culture was followed ultimately by death in only 1 case. In most of the cases which had relapses pneumococci were again cultured from the C.S.F. during the relapse. The time taken to effect a clinical cure was again variable but averaged about seven days. Evidence of a primary focus of infection was found in 13 patients, and of these 5 died, giving much the same case-mortality as for the whole series.

The aim of treatment is to maintain an adequate concentration of M. & B. 693 in the C.S.F., and it must be remembered that frequent withdrawals of fluid by lumbar puncture cannot help to maintain that steady concentration. Some patients require frequent lumbar punctures for the relief of urgent symptoms, but others do not and seem to do just as well without them. The dose of M. & B. 693 varied immensely, ranging from 12 g. in five days, which proved adequate for a man aged twenty-eight, to 155 g. in twenty-eight days, given to a man aged thirty-four who had a relapse on the fifteenth day after 80 g. had already been given. The drug was given intrathecally in case 19, and the injection was immediately followed by a violent reaction and by retention of urine; in spite of a concentration of 18 mg. of M. & B. 693 per 100 c.cm. of C.S.F. the culture remained positive, and the patient eventually died. Remarkably few toxic effects were observed in the series, slight cyanosis and nausea being the commonest; hæmaturia was reported in 1 case.

Among remedies used besides M. & B. 693 sulphanilamide was the commonest, usually being given before the result of the C.S.F. culture was known. Antipneumococcal serum was used in 5 cases which were not responding satisfactorily to chemotherapy alone. There is no clear evidence that the use of serum materially affected the course of the illness; 2 of the 5 patients receiving it died. Of the 9 fatal cases in the series 4 patients developed their meningeal symptoms either during or after a course of M. & B. 693 given for a pre-existing affection of the chest.

SENSITIVITY AND TOLERANCE OF PNEUMOCOCCI

The work of Maclean et al. (1939) has shown that pneumococci vary enormously in their sensitivity to M. & B. 693, the variation depending not on the type of the pneumococcus but on the individual strain. They have also shown that, in infected animals treated with the drug, pneumococci can readily establish a tolerance. This finding has been corroborated by Ross (1939), who obtained two cultures from a fatal case of pneumococcal meningitis treated with M. & B. 693, one shortly after the start of treatment and one post mortem. The first culture proved sensitive to M. & B. 693, whereas the second was insensitive, both strains being of much the same virulence. This would explain the fate of case 20, in whom the course was spread over a long period with a seven-day gap in the middle. In case 24 Dr. R. J. Pulvertaft carried out in-vitro experiments with the causal organism, which he found resistant to Prontosil, Proseptasine, and M. & B. 693. Whitby (1938) pointed out that the obvious defence for bacteria against drugs of this type would be the quick evolution of insensitive types, and he thought that this explained why all these drugs exerted their maximal effect on acute and not on chronic infections. As McIntosh and Whitby (1939) have shown, these drugs do nothing to increase the immunity of the body but merely have a bacteriostatic action. M. & B. 693 is rapidly excreted; hence, once the administration has been stopped, there is no longer any ban on the rapid multiplication of any organisms which have survived. They have also shown that the initial dose of the drug is not instantly active, the bacteria continuing to multiply at the same speed for the next two hours, as they would in its absence; the restraining action is not apparent before the lapse of six hours. This does not mean that the drug should be withheld in the fulminating type of case; on the contrary, there is always a chance that the patient will survive sufficiently long for the drug to take effect. The question is rather whether specific serum should be administered also, to tide over the emergency until the M. & B. 693 begins to be effective.

Case 19 is mysterious; although the illness was rather resistant to treatment from the start, a sterile culture was obtained on the twelfth day. Up to that time the patient had made steady progress, although the temperature had not fallen and a violent reaction had followed the intrathecal administration of M. & B. 693. There was no gap in the treatment, but four days later the C.S.F. again contained pneumococci, and after an indecisive phase steady deterioration followed in spite of persistent chemotherapy with M. & B. 693 and allied drugs, specific serum, and protein shock. The patient eventually died on the fiftieth day.

CASE-RECORDS

CASE 1.—On Jan. 22 at 11.30 P.M. an airman, aged 18, was admitted to an R.A.F. hospital in the midst of an influenza epidemic. He is said to have presented on admission the typical picture of a fairly severe case of influenza. He gave a week's history of sore-throat and cough, both improving, and six hours' history of feeling hot, dizzy, and generally unwell. He complained of frontal and occipital headache, and during the first night he vomited five times.

At that time we were admitting only severe influenza cases, many with affections of the chest, to that particular ward; so he was immediately given the routine treatment: M. & B. 693 2 g. followed by 1 g. four-hourly. His temperature on admission was 102° F., pulse-rate 100, respiration-rate 28.

On the 23rd, after a restless night, temperature was 103° F., pulse-rate 82, respiration-rate 28. He looked seedy and was complaining of severe frontal headache. His throat was generally injected, and there were many crepitations and rhonchi at the base of the right lung. Asked to sit up in bed he seemed unable to flex his back fully; this suggested a meningeal origin of his symptoms. He had a slight nystagmus on looking to the right, absent knee-jerks, and slight stiffness of cervical muscles; Kernig's sign was negative.

At 7 P.M. the same evening the picture was far more typical of meningitis. He was lying on his side and resented being disturbed, photophobia was present, and his neck had become much more rigid; Kernig's sign was positive, and the stiffness of the back was even more noticeable than in the morning; apart from slight diplopia and the nystagmus, there were no other abnormal neurological signs. He was still having 1 g. of M. & B. 693 four-hourly.

On the 24th temperature, pulse, and respiration were normal, though the patient seemed drowsier and generally worse. Lumbar puncture released a turbid fluid under increased pressure; a cell count showed 3600 cells per c.mm., of which 92% were polymorphs; chlorides had fallen to 700 mg. per 100 c.cm., and no organisms were seen in the direct smear; pneumococci were grown on culture.

On the 25th he was brighter and took an interest in his food and surroundings; temperature still normal. The dosage of M. & B. 693 was maintained: after 7 g. on Jan. 23 he received 6 g. daily up to Jan. 28, then 3 g. on Jan. 29, 2 g. on Jan. 30, and 1·5 g. on the next two days, after which it was stopped, a total of 25 g. having been given in ten days. On Jan. 26

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TABLE SHOWING PUBLISHED CASES OF PNEUMOCOCCAL MENINGITIS TREATED WITH SULPHAPYRIDINE

Case	Age and sex	Duration of symptoms before treatment with M. & B. 693	Lumbar punctures	First signs of clinical improvement	Temperature falls to normal	C.S.F. became sterile	Patient cured clinically	Cell count in C.S.F.	Dose of M. & B. 693	Other remedies used	Relapses	Primary focus of infection	Toxic effects of M. & B. 693
1	7 F	6 days	5	48 hours	12 hours	3 days	10 days	Numerous	22·5 g. in 10 days	Nil	Nil	Nil	Cyanosis 3rd day
2	14 M	3 ,,	6	Almost at once	24 ,,	1 day	48 hours	?	Not recorded but upwards of 40 g.	40 c.cm. Soluseptasine. 40,000 units antipneumococcalserum, types i–ii	4th day	,,	Hæmaturia 3rd–5th day
3	47 F	2 ,,	5	24 hours	2–3 weeks (sinusitis)	Before M. & B. 693 started	7 days	1360	50 g. in 7½ days	Sulphanilamide 15 g.	Nil	? sinusitis	Nausea and cyanosis 2nd day
4	10 F	42 hours	6	12 ,,	24 hours	Always	5 ,,	600	14·5 g. in 36 hours	Myringotomy	,,	Acute otitis media	Nil
5	1⅔ M	Few hours	10	12 ,,	3 days	6 days	24 ,,	Very numerous	28·5 g. in 25 days	0·96 g. Septolix intrathecally	,,	Pneumonia R.U.L.	,,
6	39 M	24 hours	4	24 ,,	48 hours	4 ,,	12 ,,	?	40 g. (approx.) in 10 days	Soluseptasine 70 c.cm. 10% solution, Paracentesis	9th–11th day (pyrexia only)	Acute otitis media	,,
7	24 M	60 ,,	4	36 ,,	36 ,,	36 hours	8 ,,	2960	25·5 g. in 7 days	Nil	Nil	Nil	Muzzy feeling in head
8	15 M	Few hours	15	4 days	3 days	48 ,,	9 ,,	3266	52 g. in 14 days	,,	,,	Acute mastoiditis	Nil
9	35 F	48 hours	16+	5 ,,	7 ,,	3 days	40 ,,	?	135 g. in 51 days (40 g. in 6 days, gap for 26 days, 95 g. in 19 days)	120 c.cm. antimeningococcal + 300 c.cm. antipneumococcal serum	33rd day	Mastoiditis	Erythematous skin eruption and vomiting
10	14 F	4 days	17	48 hours	6 ,,	14 ,,	7 ,,	?	Not recorded	41 c.cm. complement. 36 c.cm. type xx rabbit serum	Nil	Nil	Nil
11	28 M	7 ,,	3	48 ,,	3 ,,	4 ,,	3 ,,	5000	12 g. in 5 days	Sulphanilamide 6 g.	,,	,,	Cyanosis
12	59 M	5 ,,	1	Nil	—	—	Died	5400	4 g. in 24 hours	Nil	—	,,	Nil
13	30 M	3 ,,	2	?	?	?	7 days	14,000	40 g. in 10 days, 30 g. 14th–24th day	,,	14th day	,,	,,
14	53 F	2 ,,	1	Nil	—	—	Died	?	11 g. in 40 hours	,,	—	? right ear	,,
15	6 M	12 hours	1	,,	—	—	Died after 2½ hours	Numerous	1 g. in 2½ hours	,,	—	Nil	,,
16	2½ M	Already receiving M. & B. 693	1	,,	—	—	Died	860	14 g., 8·5 g. before meningitis	,,	—	Pneumonia	,,

a second lumbar puncture released a perfectly clear sterile fluid not under increased pressure. The knee-jerks returned on Feb. 3, and by the 10th the patient was getting up and reading three novels a day without any sign of a headache.

CASE 2.—At 10 P.M. on July 17 an airman, aged 27, was admitted to the same hospital with a 24-hour history of shivering attacks, severe occipital headache, and pains in the back of the neck, arms, and calves. He had felt worse on the day of admission and had vomited on the way to hospital.

On admission he looked extremely ill, was crying out with the pain in his head, and was semi-delirious; temperature 102° F., pulse-rate 82. Photophobia intense, cervical rigidity extreme, Kernig's sign strongly positive. Immediate lumbar puncture released a cloudy fluid under greatly increased pressure, with a cell count of 8200, nearly all polymorphs. Pneumococci were numerous in the direct smear and grown on culture. A course of M. & B. 693 was started at once, 2 g. two-hourly being given for the first three doses, then 1 g. four-hourly. Within twenty-four hours there was a slight, and within forty-eight hours a decided, improvement, the headache being far easier and the cervical rigidity less.

On the fifth day all symptoms had departed, and to all appearances the patient was perfectly well, though a faintly positive Kernig's sign was still obtainable; another lumbar puncture on that day released a clear fluid, under normal pressure, which was sterile, the cell count having fallen to 25; in a direct smear of the deposit only a few lymphocytes could be seen. The administration of M. & B. 693 was continued in diminishing doses up to July 26, when it was stopped, 40 g. having been given in nine days. Progress has since been rapid and uneventful, and there are no complications.

The interest in case 1 lies in the short time that elapsed between the onset of symptoms and the beginning of treatment (about seven hours), though this was

PUBLISHED CASES OF PNEUMOCOCCAL MENINGITIS TREATED WITH SULPHAPYRIDINE—(*continued*)

Case	Age and sex	Duration of symptoms before treatment with M. & B. 693	Lumbar punctures	First signs of clinical improvement	Temperature falls to normal	C.S.F. became sterile	Patient cured clinically	Cell count in C.S.F.	Dose of M. & B. 693	Other remedies used	Relapses	Primary focus of infection	Toxic effects of M. & B. 693
17	34 M	3 days	27	48 hours	3 days	14 days	5 days	61	80 g. in first 14 days, 75 g. 15th–28th day	Nil	15th day	Nil	Nil
18	63 M	4 ,,	1	24 ,,	Never	Never	Died in 2 days	275	10 g. in 2 days	40 c.cm. of 40 R.P.	—	,,	,,
19	43 F	3 ,,	40	3–4 days	,,	12 days	Died on 50th day	660	114 g. in 32 days	62 g. sulphanilamide. 1360 c.cm. antipneumococcal serum. Protein shock on two occasions	15th day, proved fatal on 50th day	,,	(1) Cyanosis (2) Retention of urine
20	1½ F	During treatment with M. & B. 693	1	Nil	—	—	Died	Abundant	29 g. (15 g. in 15 days, gap of 7 days, 14 g. in 14 days)	Sulphanilamide 4 g.	—	Empyema	Nil
21	Adult M	Occurred after 24 g. of M. & B. 693	0	,,	—	—	,,	—	24 g. in 9 days prior to development of meningitis	Nil	—	Pneumonia	,,
22	9 M	6 days	4	3 days	24 hours	4 days	3 days	300	24·5 g. in 8 days, 16 g. from 10th–20th day	Transfusion. 350 c.cm. blood Drainage of right frontal sinus	10th day	Frontal sinus	,,
23	7 F	3 ,,	3	4 ,,	48 ,,	8 ,,	7 ,,	?	9·33 g. M. & B. soluble intramuscularly, +6·75 g. orally in 9 days	Nil	Nil	Nil	Sterile abscess at site of injection
24	1½ M	During treatment with M. & B. 693	12	Nil	—	—	Died	1000	12·5 g. in 8 days	80,000 units antipneumococcal serum, type iv	—	Pneumococcal infection of nasopharynx	Nil
25	23 M	24 hours	12	48 hours	48 hours	4 days	10 days	10,000	1 g. M. & B. soluble, 36 g. by mouth in 6 days	Nil	Nil	Nil	,,
26	38 M	5 days	9	48 ,,	48 ,,	4 ,,	12 ,,	624	27 g. in 4 days	,,	,,	,,	,,
27	41 F	48 hours	3	24 ,,	3 days	24 hours	3 ,,	Numerous	27·75 g. in 9 days (4·25 g. by intramuscular injection)	,,	,,	Chronic suppurative ethmoiditis	Cyanosis 4th day. Erythema 9th day

AUTHOR REPORTING CASE

1. Reid (1938).
2. Robertson, K. (1938).
3. Cunningham (1938).
4. Hughes (1939).
5. Caussade et al. (1939).
6. Robinson (1939).
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8. Yule (1939).
9. Morhange (1939).
10. Cutts et al. (1939).
11–15. MacKeith and Oppenheimer (1939).
16. May (1939).
17. Raman (1939).
18. Celice and Soalhat (1939).
19. Bertrand-Fontaine and Schneider (1939).
20. Aitchison (1939).
21. Dowds (1939).
22. Dunlop and Laurie (1939).
23. Cable (1939).
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25. Robertson, F. J. (1939).
26. Holmes (1939).
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due to good luck rather than to good judgment and resulted from the routine prevailing in that ward at the time. It may have been because treatment had already been begun that the course was atypical for the first twenty-four hours, and early treatment may have been responsible for the rapid and steady progress. The white blood-count showed no leucocytosis at any time; in fact there was a tendency to leucopenia: on Jan. 24, when the patient was at his worst, the white count was 6400, of which 77% were granular. On Jan. 26 it was 5000, with 72% granular, and daily counts for the next week gave figures varying between these two, always with a normal percentage of granular cells, thus making it unlikely that the M. & B. 693 had anything to do with the matter. In case 2 the maximal leucocytosis was 11,800, although the infection seemed to be of great virulence judged on clinical grounds and on the findings in the C.S.F.

CONCLUSIONS

(1) M. & B. 693 has reduced the case-mortality of pneumococcal meningitis from close on 100% to about 35%.

(2) To be effective, M. & B. 693 must be given in large doses at the outset; at least 6 g. a day should be given to an adult for the first four or five days, after which the dose can gradually be decreased.

(3) There is no reliable clinical evidence that antipneumococcal serum is of any value in a straightforward case.

(4) Frequent lumbar puncture should be avoided, except where it is indicated for the relief of the patient.

(5) M. & B. 693 should be continued in decreasing doses for at least a week after the temperature has returned to normal.

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(6) A patient who is going to recover will nearly always show some signs of clinical improvement within the first three or four days; and, if improvement is noticed at all, the patient almost always makes a complete recovery in the end.

(7) Provided that dosage has been adequate, cases proving resistant to treatment are due either to a strain of pneumococci insensitive to M. & B. 693, or to a strain which has become tolerant to the drug.

My thanks are due to Group-Captain J. J. Conybeare for helpful criticism and advice.

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BLOOD-UREA AND PLASMA CHLORIDE IN EXPERIMENTAL HÆMORRHAGE

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IN the investigation of the functional pathology of hæmatemesis and melæna (Black 1939, Black and Leese 1940) the questions arose to what extent the rise of blood-urea could be attributed to hæmorrhage per se, and to what extent other factors, such as over-production of cortin (Borst 1936), might explain the aberrations in blood chemistry.

BLOOD-UREA

Hæmorrhage.—Experiments which I have carried out on dogs indicate that the rise of blood-urea produced by simple hæmorrhage is slight, averaging only 16 mg. per 100 c.cm. in six experiments in which 20–50% of the blood volume was removed (table I). These results are in accord with those of Stewart and Rourke (1936) and of Kaump and Parsons (1940). Our dogs were neither restricted in their fluid intake nor subjected to several hæmorrhages at short intervals; the work of Meyler (1936) on guineapigs suggests that a much larger rise of blood-urea might have been produced by combining repeated bleeding with deprivation of fluid, but permission to repeat his work, on dogs, could not be obtained.

Cortin.—Borst (1936) has suggested that over-activity of the suprarenal cortex may be responsible for some of the biochemical changes observed after alimentary hæmorrhage; and an increased output of adrenaline is found as part of the response to bleeding. In three further experiments I combined bleeding with the administration of 30 c.cm. of Eucortone in the first experiment, 100 mg. of desoxycorticosterone acetate (D.O.C.A.) in the second, and 7·5 c.cm. of a 1 in 1000 solution of adrenaline at the rate of 1 c.cm. every six minutes in the third. The results, given in table I, show that

TABLE I—EFFECT OF HÆMORRHAGE ON BLOOD-UREA

Dog		Volume of blood taken (c.cm.)	Blood-urea (mg. per 100 c.cm.) Before bleeding	½ hr. after	3–5 hrs. after	20 hrs. after
1		200	35	35	36	28
		260	34	38	36	31
		400	46	54	74	..*
2		270	30	37	68	44
3		460	28	30	36	26
		350	22	32	38	29
	(cortin)	290	29	29	30	18
	(D.O.C.A.)	300	18	13	32	..
	(adrenaline)	200	16	17	23	..

* Died 4 hours after bleeding.

suprarenal extracts, even in large doses, do not increase the "azotæmia of hæmorrhage." The continuous injection of adrenaline made the dog very ill, whereas the dogs treated with eucortone and with D.O.C.A. recovered more rapidly from the shock of bleeding than did the animals not so treated.

Artificial uræmia.—Since an increase in protein intake can be excluded, the rise in blood-urea after external hæmorrhage must be due either to breakdown of body protein or to impaired elimination of urea by the kidneys. To test whether renal impairment was produced, the effect of hæmorrhage on the rate of disappearance of an artificial uræmia was studied. It was found that, when 5 g. of urea in solution was given with a stomach-tube, the blood-urea rose about 50 mg. per 100 c.cm. and returned almost to the original level in six hours. Fig. 1 shows two composite curves, the one derived from six experiments in which urea was given alone, the other based on two experiments in which the administration of 5 g. of urea was followed by withdrawal of 320 c.cm. of blood, after an interval of half an hour to avoid possible interference with the absorption of the urea. The elevation of blood-urea is much more sustained after bleeding, in spite of the fact that the initial rise of blood-urea was less in the two experiments in which blood was withdrawn than in the others. Since, in a previous experiment on the same dog, the withdrawal of 460 c.cm. of blood had led to a rise of less than 10 mg. per 100 c.cm. in the blood-urea, it is not likely that the prolongation of the artificial azotæmia is due to the effect of bleeding on the tissues; the probable explanation is that the elimination by the kidneys of the urea ingested and absorbed was interfered with by the circulatory changes which follow hæmorrhage. Renal impairment might therefore lead to elevation of blood-urea even in the absence of any increase in protein katabolism, though the results of my experiments do not exclude the latter as a causal factor.

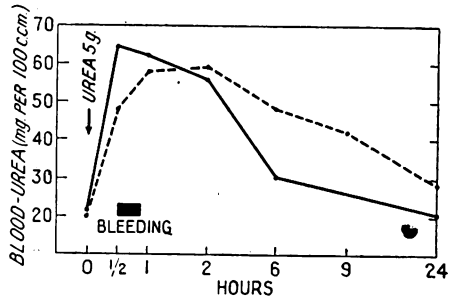

FIG. 1—Chart showing effect of hæmorrhage on the rate of disappearance of artificial uræmia in dogs. Continuous line: composite curve from six experiments in which urea alone was given. Interrupted line: composite curve from two experiments in which the administration of urea was followed, half an hour later, by withdrawal of 320 c.cm. of blood.

PLASMA CHLORIDE

Borst (1936) has shown that the level of plasma chloride is raised in some patients with alimentary hæmorrhage, whereas other workers have reported a normal or even a diminished amount of plasma chloride. Table II shows that both increase and diminution of plasma chloride may be observed after experimental hæmorrhage. The level of plasma chloride rose 2–4 m.eq. per litre after five of the six hæmorrhages studied; this rise, which coincides with rapid dilution of the blood,

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can be explained by the passage into the blood-stream of tissue fluid, which has a higher chloride content than has plasma (Loeb et al. 1922). When the hæmorrhage is small, the raised level of plasma chloride persists until the next day. With larger hæmorrhages the chlorides fall below normal limits (fig. 2). After such hæmorrhages the animals eat less meat but drink large quantities of water; hence the fluid absorbed from the bowel contains little chloride, and its addition to the blood explains the observed hypochloræmia.

CONCLUSION

A considerable increase in blood-urea is a well-recognised concomitant of severe hæmorrhage into the digestive tract. My experiments show that over-activity of the suprarenal glands cannot be an important causal factor; they suggest that loss of blood is less important than the fact that the blood is effused into the bowel, whence the nitrogen is reabsorbed. The greatest increases in blood-urea have been recorded in patients deprived of food and fluid (Jones 1939), whereas patients who have had an adequate intake of food and fluid show a relatively slight degree of azotæmia (Black and Leese 1940). It may therefore be inferred that the slight increase of blood-urea proper to hæmorrhage may be aggravated by absorption of nitrogen from the blood in the bowel, especially when dehydration is permitted. Little can be done to prevent nitrogenous absorption from decomposing blood, but dehydration calls for energetic treatment by a diet of adequate fluid content, as advocated by Meulengracht and others.

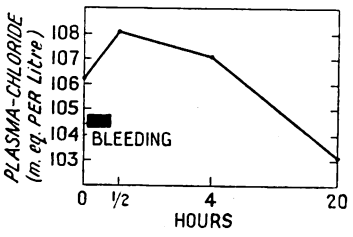

FIG. 2—Chart showing changes in plasma chloride after hæmorrhage.

TABLE II—EFFECT OF HÆMORRHAGE ON PLASMA CHLORIDE

Dog	Volume of blood taken (c.cm.)	Plasma chloride (m.eq. per litre)			
		Before bleeding	½ hr. after	3–5 hrs. after	20 hrs. after
1	200	100	102	104	103·6
	260	103·4	106	100·8	97·8
	400	109·8	113·7	...	...
2	270	113·2	113·2	108·7	108·5
3	460	105·4	107·2	103·3	101·3
	350	107	109	111·5	105

SUMMARY

After severe hæmorrhage in dogs the blood-urea increases by about 15 mg. per 100 c.cm.; the rise in level of blood-urea is not increased by large doses of cortin, D.O.C.A., or adrenaline. Bleeding prolongs the uræmia produced by feeding urea; this suggests that renal function is impaired by hæmorrhage. The changes in plasma chloride after hæmorrhage are relatively slight. The results of the experiments confirm the advisability of giving fluid feeds after alimentary hæmorrhage in man.

I am much indebted to Prof. S. R. Mettier for advice and help; Prof. L. J. Witts for supervising the research and criticising this paper; and Messrs. Ciba, Ltd., for supplying D.O.C.A. in solution for intravenous injection in animals.

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SPONTANEOUS PNEUMOTHORAX
COMPLICATING STAPHYLOCOCCAL SEPTICÆMIA

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SINCE Long (1940) drew attention to the use of sulphathiazole in staphylococcal infections, increasing attention has been paid to septicæmia caused by *Staphylococcus aureus*. This condition is much commoner than was formerly supposed. Of 53 patients who died from septicæmia in the London Hospital in the last five years (exclusive of cases of subacute bacterial endocarditis) the invading organism was *S. aureus* in 41, only 12 being due to a hæmolytic streptococcus. Another fact which has become evident is the frequency with which these patients develop miliary abscesses in the lungs. Thus one of us (E. C. B. B.) found multiple lung abscesses in 75 of 92 fatal cases of acute osteomyelitis. This is important because to cure staphylococcal septicæmia it is necessary to arrest the bacteræmia, by excision or drainage of the primary focus together with treatment by antitoxin and chemotherapy, before the lungs become widely affected.

Maxwell (1934) emphasised the common incidence of *S. aureus* in cultures taken from lung abscesses and heart blood (in 58 of 105 cases in which the bacteriology was studied). Reimann (1933) described 6 cases of pneumonia with multiple abscesses of lung as primary bronchogenic staphylococcal infection; repeated blood-cultures were not performed in these cases, though one in each patient was sterile. The illnesses ran a long course, and all the patients recovered. It seems possible that they may have been cases of septicæmia in which the blood infection was overcome, as in our case 2, or had never been proved positive, as in our case 1. Hughes (1938) described a further 2 cases of staphylococcal pneumonia and suggested that, next to the skin, the lung is the tissue most susceptible to invasion by *S. aureus*. Maxwell (1934) found pyopneumothorax as a complication in 6 of 199 cases of single abscess of lung and in 5 of 116 cases of multiple abscesses of lung. One of us (K. M. A. P.) found pyopneumothorax as a complication of lung abscess in 3 of 116 cases of spontaneous pneumothorax.

It is surprising that in all these reports of staphylococcal infection of lungs nothing is said about spontaneous pneumothorax as a complication, especially since the abscesses mostly develop at the periphery of the lung. Recently, however, 4 cases have been reported in infants:—

Macgregor (1936) reported 3 cases of pyopneumothorax discovered at necropsy in infants, two aged four and one aged six months; and Collis and Foster-Carter (1940) 1 in a baby, aged eight weeks, in which they emphasised the absence of fluid from the pleural cavity.

We have seen 2 fatal cases; in the first a right-sided spontaneous pneumothorax developed, which clinically, radiologically, and on paracentesis showed no fluid, though later a small amount was found at necropsy. In this case the differential diagnosis between a reactivated pulmonary tuberculosis, a ruptured emphysematous bulla, and the rupture of a miliary lung abscess was very difficult. In the second case there was a bilateral spontaneous pneumothorax, and here again the amount of fluid was negligible.

CASE-RECORDS

CASE 1.—Male, aged 55, admitted on April 15, 1940, with seven days' swelling of the left side of his face after he had bitten the inside of his mouth. For two days his left eye had swollen. There was gross swelling of the left side of his face, with œdema and chemosis of his left eyelid and slight proptosis. His teeth were septic, with many infected stumps.

On the 16th two incisions were made in the face and pus was drained. Culture showed *S. albus* and *Streptococcus viridans*. Blood-culture was sterile on two occasions. On the 23rd a course of sulphathiazole (M. & B. 760) 2 g. four-hourly for two days was started, a total of 24 g. being given. On the 26th a blood-count showed haemoglobin 64%, white

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cells 28,000 (polymorphs 87%). The patient's face discharged freely and rapidly improved. On May 9 signs of cellulitis of the left orbit appeared, and a large abscess was drained from the inner side of the eye. Culture as before. On the 12th he developed a sudden pain in the right chest, with signs of a right pneumothorax. There was considerable displacement of the mediastinum towards the left. The diagnosis was confirmed by needling, and the intrapleural pressures were minus 6 plus 6; 200 c.cm. of air was removed, bringing the pressures to — 8 and 0. On the 13th a radiogram of the chest showed a right pneumothorax, with complete collapse of the lung except at the apex, where a small cavity was held open by two adhesions (fig. 1). No tubercle bacilli were found in the sputum. A further 300 c.cm. of air was withdrawn, the pressures being — 8, + 4 at the start and — 6, 0 at the end. On the 14th the patient became much worse and died (fig. 2).

Necropsy.—Complete pneumothorax on the right side with collapse of the right lung. Old tuberculous focus with small

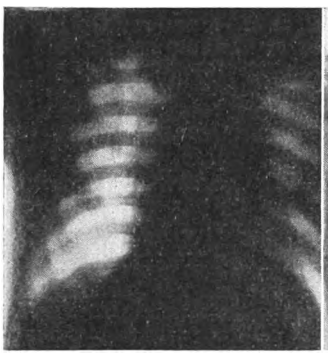

FIG. 1

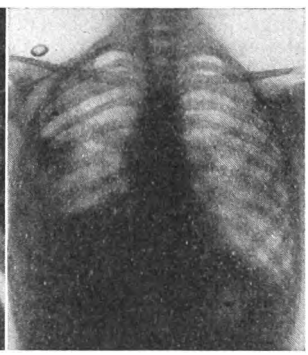

FIG. 3

FIG. 1—Radiogram of case 1, showing right pneumothorax, with complete collapse of the lung except at the apex, where a small cavity is held open by two adhesions.
FIG. 3—Radiogram of case 2, showing bilateral pneumothorax with numerous large abscesses in the right lung.

cavity at the right apex, over which was the adhesion seen in the radiogram. Two small pyæmic abscesses in the right lower lobe, one of which had ruptured into the pleural cavity. A little cloudy fluid in the right pleural cavity. Left lung was normal. The cellulitis of face had completely healed. The left orbit had nearly healed, and there was no evidence of intracranial infection or of lateral-sinus thrombosis. Culture from the lung abscess grew *S. aureus*. Histological section showed the lesion in the apex to be an old healed tuberculous lesion. Section of the abscess in the right lower lobe showed an acute non-tuberculous abscess surrounded by inflamed collapsed lung tissue.

CASE 2.—Male, aged 12, admitted May 17, 1940, with four days' swelling inside his left nostril. Two days before admission his face and left eye had begun to swell, and he had become increasingly ill. On admission he was very ill but not delirious, with a swelling of the left nostril and several small pustules on the outer side of the ala nasi. There was œdema of the upper face and eyelids and chemosis of the left eye. Blood-culture produced *S. aureus*. Blood-count: hæmoglobin 89%, leucocytes 16,000 (polymorphs 86%).

On the 18th he was delirious, and the œdema had intensified. Staphylococcal antitoxin 20,000 units was given intramuscularly. Sulphathiazole (M. & B. 760) 1 g. was given intravenously and then 1 g. four-hourly by mouth until a total of 30 g. had been given. On the 22nd he developed signs of meningitis. Lumbar puncture showed cloudy fluid under pressure, with 230 cells per c.mm., there being an excess of polymorphs. Culture produced *S. aureus*. Lumbar puncture was done daily for five days. At the end of that time the fluid was clear and sterile. On the 23rd an incision was made in the face, but no pus was obtained. Culture from the pustules on the face had grown *S. aureus*. Blood-culture on May 5 gave 140 colonies, on the 21st 130, on the 24th 50, on the 26th 25 and on the 30th 2 colonies per c.cm. of blood. Cultures on June 1 and 3 were sterile.

Meanwhile the boy had developed a right hemiplegia and was desperately ill. On May 29 signs of a right pneumothorax appeared. His chest was needled and 880 c.cm. of air withdrawn. Intrapleural pressures were + 5, + 15 at the start and — 10, 0 at the end. On the 31st 680 c.cm. of air was withdrawn from right and 160 c.cm. from left chest. On June 2 a radiogram of the chest showed a bilateral pneumothorax with numerous large abscesses in the right lung (fig. 3).

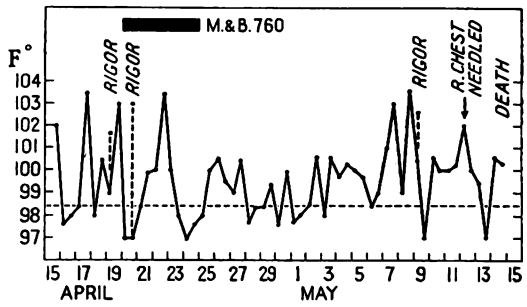

FIG. 2—Chart of case 1.

On the 3rd the patient became distressed and 900 c.cm. of air was withdrawn from the right pleural cavity and an attempt made by continuous suction to get the lung to adhere to the chest wall. This was partially successful. On the 5th 800 c.cm. of air was removed from right chest. The pressures were — 5, + 5 at the start and — 15, — 5 at the end. No fluid was demonstrable in either pleural cavity. The patient rapidly became worse (see fig. 4) and died on the 22nd.

Necropsy.—Extradural and intradural abscesses, with local leptomeningitis. Purulent thrombosis of left ophthalmic veins but no evidence of cavernous-sinus thrombosis. Upper part of right pleural cavity full of air, with little thin pus; lower half contained mass of soft fibrin, with little organisation. Left pleural cavity also contained air but no pus. Many pyæmic abscesses up to 4 cm. in diameter in both lungs. Perforation 0·8 cm. in diameter leading from an abscess in left upper lobe into the pleural cavity. No communication demonstrated between right lung and pleura. Remainder of lungs showed various degrees of collapse, greater on right side than left. Rest of body showed no pyæmic abscesses except few small ones in both kidneys.

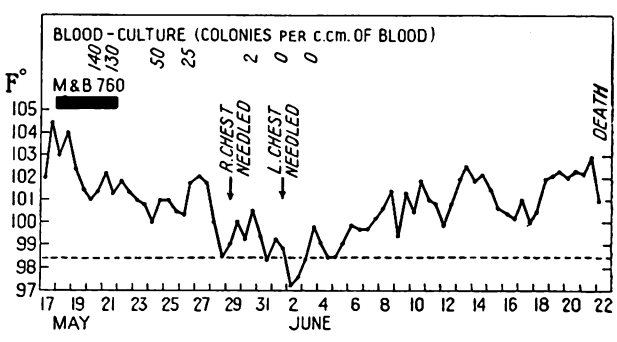

FIG. 4—Chart of case 2.

These two cases indicate how pyæmic abscesses developing in septicæmia due to *S. aureus* can cause spontaneous pneumothorax. They also show how pulmonary complications can bring about death in this condition even if the blood-culture becomes sterile, as in case 2.

SUMMARY

Staphylococcal septicæmia and its pulmonary complications are not so rare as is generally supposed.

Two cases of spontaneous pneumothorax, one unilateral and one bilateral, resulting from the rupture of pyæmic staphylococcal abscesses of lung, are recorded.

In these two cases and in other sreported only a small amount of thin pus collected, and this is often clinically unrecognisable.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

SECTIONS OF SURGERY AND OF THERAPEUTICS AND PHARMACOLOGY

AT a joint meeting of these sections on Nov. 6, with Mr. J. B. HUNTER in the chair and Sir WILLIAM WILLCOX in support, a discussion* on the

Treatment of Burns

was opened by Rear-Admiral C. P. G. WAKELEY. At the beginning of the war, he said, tannic acid was thought to be completely satisfactory as a treatment for burns, but this had not turned out to be so. In a battleship in action there were only sufficient time and space for first-aid treatment. More elaborate care was given later in hospital. Burns occurred from gun-flash, bomb-flash, incendiaries, or petrol. Shock should be treated with plasma-transfusion and morphia in doses of gr. ½; morphia would never kill a man in pain. In first- and second-degree burns there was partial skin loss but signs of dermal circulation remained; in third-degree burns there was total skin loss and the surface was yellowish and dull without signs of dermal circulation. Primary shock depended on the extent of the burn; secondary shock set in a few hours later and was responsible for 80% of the total deaths from burns. Primary might merge into secondary shock. There was loss of plasma from the burned surface and migration of fluid from the blood into the tissues so that the circulating blood became concentrated with a relative increase of cells. Whole-blood transfusion was contra-indicated because it increased the cell concentration, and so were saline and glucose infusions, because they passed quickly into the tissues and increased the œdema. It was necessary to replace the lost plasma protein by plasma-transfusion. Toxæmia following burns had not yet been fully explained; it seemed to be due to streptococcal infection. Thanks to coagulation therapy toxæmia was less common in this war than it had been in the last. In the treatment of sepsis, saline baths were proving valuable. First-aid treatment must be simple, painless and quickly applied. In the limited space available on a battleship some jelly preparation was desirable; there was no time to use a spray. He was using successfully gentian-violet jelly containing Merthiolate 1 in 5000; it was applied without cleansing directly to the burned area. The tubes in which it was stored came to no harm if dropped into sea water or oil. No tannic-acid preparation must be used on burns of the hands or face. Used on the hands it led to increase in œdema, compression of the circulation and necrosis of the fingers. Shock must be treated in hospital. The use of the B.L.B. mask reduced the incidence of fat embolism. After the shock had been treated the patient was taken to the theatre and anæsthetised with gas and oxygen; the burned area was cleansed and dried with an electric hair-dryer, and a preparation to produce tan was applied; if sepsis followed he was given another anæsthetic and the area was cleansed and re-tanned. Tan loosened on the eighth or ninth day leaving a healed scar. Sulphonamide was rarely needed. In third-degree burns the patient needed to replace his sulphur loss, and was unable to do so if he was taking sulphonamides; they also tended to cause vomiting which reduced his body fluids still further. Another method of treatment now proving useful was irrigation within an oiled-silk envelope which enclosed the injured limb. When a burn was complicated by an open wound or fracture the injured part must be immobilised in the usual way. Skin grafting was essential for third-degree burns. After the healing of a first- or second-degree burn it was important to massage the new skin with lanoline daily for six weeks, to prevent the development of keloid. The end-result of these burns was seen not immediately after healing but three months later when keloid and contractures developed; they must be followed up as carefully as fractures. Chemical burns due to phosphorus were treated with 2% copper sulphate followed by triple dye. Masks might reduce the danger of face burns in the future.

Prof. W. C. WILSON said that the systemic disturbance caused by extensive burns was still unexplained. Exposure to excessive heat killed or injured blood-vessels, nerve-endings and nerve-fibres, and the damage to nerves was possibly responsible for the initial shock, though there was little evidence in support. Injury to blood-vessels might be responsible for secondary shock and might begin earlier than was thought, in some cases within 45–50 minutes of the injury. The capillaries were abnormally permeable and serum left them carrying protein, sodium and potassium; the increased corpuscular concentration thus produced was important. Saline and glucose infusions passed quickly through the excessively permeable capillary walls carrying still more protein with them. Shock was most profound in deep burns but the plasma loss was greater in superficial burns. Oliguria was nearly always present for the first 24 hours, and was unaffected by the intake of large quantities of fluid. In toxæmia the characteristic lesion was necrosis of liver cells. Impaired liver function might be indicated by jaundice. Liver necrosis was not found in cases where the burns showed the worst infections. Coagulation therapy did not stop exudation, which continued beneath the coagulum for 24 hours, but it minimised it, relieved pain and diminished shock. Although the underlying dead tissues might be as much as 1 cm. thick, and the coagulum only about 1 mm., it rendered conditions unfavourable for bacterial growth, and so reduced sepsis. Desoxycorticosterone helped to raise the serum sodium quickly to the normal level.

Wing-Commander CECIL FLEMMING said that in the R.A.F., unlike the Navy, there was an opportunity to treat cases early in hospital. Burns usually occurred on hands and faces and were complicated by cuts. If worse injuries were present they were usually fatal owing to the associated shock. He wanted to know how soon to give an anæsthetic and what anæsthetic to give. To say that it must depend on the degree of shock was not sufficient because the measurement of shock depended on the judgment of the surgeon, unless some pathological clue was available. He had tried going by the hæmoglobin concentration, but it was not a reliable guide if the patient had been bleeding. The choice of anæsthetic was limited when the face was badly cut, the cheeks perforated perhaps and the nose charred. He had chosen intravenous anæsthetics in these cases, but he thought that one death had probably been due to 3 c.cm. of intravenous Pentothal. He would like to know whether he would be justified in performing tracheotomy in such cases to enable the anæsthetic to be given intratracheally. He had given up thinking in terms of shock and now went by the pulse-rate, the blood-pressure and the state of the body fluids. He found it impossible to make a clear distinction between primary and secondary shock, and judged each case on its merits. He found that by giving reconstituted dried serum at once, he could treat some cases earlier than would otherwise be possible.

In the absence of Prof. L. J. WITTS his paper was read by Dr. D. A. K. BLACK. In burns, he said, death was likely to occur early from shock or later from toxæmia. Using citrated plasma and reconstituted serum they had seen improvement in all patients. They gave plasma to any patient in whom the hæmoglobin was 10% above the probable previous value; reckoning this as 100 it was possible to calculate the plasma lost by the formula:

$$\frac{Hb}{100} = \frac{5}{5-x}$$

where x is the plasma lost in litres. Plasma to the amount of the calculated deficiency should be run in quickly, and more should be run in later by slow drip to make good the loss by exudation. Fluids should be given freely when the patient could take them, and the fluid balance charted. They had seen patients recovering who otherwise would have died from shock.

Mr. A. H. MCINDOE said that the aim in the treatment of burns was to save life and preserve function. The local treatment of war cases had shown that coagulation treatment, especially by tannic acid, had been carried

* An illustrated report of this discussion will shortly be obtainable from the R.S.M. price 1s. post free.

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too far. For first- and second-degree burns coagulation had proved excellent. For third-degree burns it was likely to fail; sepsis occurred deep to the coagulum and months might elapse before it separated, leaving a heavily infected granulating surface. By that time the patient was emaciated and ill from toxæmia and grafting was impossible. In third-degree burns of the hands coagulation treatment led to crippling, and œdema might lead to further deformities. The raw surface of a third-degree burn of the hand must be covered by a skin graft if function was to be maintained. The same principle applied to the face; coagulation therapy immobilised the eyelids, the eyes became inflamed and inaccessible to treatment and sight might be lost. Tanning of third-degree burns, especially of the hands and face, should be abandoned.

PHOTOGRAPHS AND FILMS

Mr. McINDOE then showed a series of photographs of cases treated with tannic acid illustrating such points as deformities of the hands, with necrosis and loss of terminal phalanges, and contractures of eyelids leading to ectropion and corneal ulceration. He was getting good results, he said, by treatment with saline baths at 105° F. The patient could be completely immersed, and usually found after the first bath that pain was relieved. On being lifted out by a skilled team he was laid on a sterile sheet and the burned areas were covered with tulle-gras and then with saline packs. It was a rule of the ward that no patient was to be hurt. When the granulating areas were clean they could be treated with pinch or Thiersch grafts.

Lieut.-Commander JOHN BUNYAN showed a coloured film of a child with an extensive burn of the abdominal and lower thoracic wall which had failed to heal over a period of months. The area was treated by irrigation within one of the Bunyan-Stannard oiled-silk envelopes which he had devised. The irrigating fluid was saline containing electrolytic hypochlorite; the envelope was fixed in place round the body and the irrigating fluid run into it at intervals and then drained out. It was painless; the child who had previously been alarmed by the mere presence of a doctor in the ward was laughing during treatment. The course of healing could be watched through the oiled silk, and dead tissue and stale exudates were washed away during irrigation. Healing was rapid.

DISCUSSION

Sir HAROLD GILLIES thought the case for treatment by other methods than tannic acid was strong and agreed that saline treatment was improved by the Bunyan bag. He found the sulphonamide drugs useful, especially when applied locally as a powder or made up with glycerin and cod-liver oil.

Mr. R. VAUGHAN HUDSON suggested that treatment of a burn with tannic acid was the same as preliminary suture of a wound without drainage. If skin was not completely destroyed it had power of regeneration, but if destruction was complete the burned area could only heal by granulation and scar tissue unless skin was brought from elsewhere.

Colonel LEONARD COLEBROOK agreed with Sir Harold Gillies that there was hope in local treatment with sulphonamides. He had treated 38 wounds once or twice a day with sulphonamide powder and had found that hæmolytic streptococci had disappeared within 2 or 3 days; there had only been 2 failures in the series.

Mr. T. P. KILNER said that at the Ministry of Pensions hospital at Roehampton they saw hands crippled as a result of tannic-acid therapy; they managed to get some improvement with wax baths. He asked whether patients were instructed to make active movements during saline-bath treatment.—Mr. McINDOE replied that they were encouraged to use their hands and limbs in the saline bath from the start.

SECTION OF OTOLOGY

AT a meeting on Nov. 1 Mr. LIONEL COLLEDGE, the president, opened a discussion on

Injuries of the Ear

He divided war injuries into those with rupture of the tympanic membrane and those with concussion. Both might occur together, but this was not common and it almost seemed as though rupture was a protective mechanism against concussion. When the drum-head was ruptured the margins of the tear were often seen everted towards the meatus, because a wave of positive pressure had been followed by one of a negative pressure. The positive pressure was shorter and more powerful, the negative pressure was weaker but lasted longer. The physical conditions were the same when some windows were driven into a building while others were torn out; and similar effects had recently been shown to occur in blast injuries of the lungs. Concussion without rupture of the drum-head might take effect through the bones of the skull or merely result from alterations in atmospheric pressure acting upon the ear itself. Cases occurred more commonly among war injuries, but were occasionally seen in civilian practice as the result of explosions of fire-damp. Wounds of the ear in warfare were not very common, or rather, were not commonly seen, because like wounds of the heart they were nearly always fatal. If removal of the missile was necessary and was impossible along the route of entry, the retro-aural incision was the right one and the radical operation on the one required. Loose pieces of bone and damaged soft tissues must be removed at the same time. If the missile went deeper into the petrous bone it might be necessary to open the labyrinth in order to reach it. Facial paralysis and injury to the temporamandibular joint were reported to be commoner with wounds than with suppurative conditions. Injuries of the type seen among aviators were known before the aeroplane, from aeronauts and from workers in caissons. They were due to rapid changes in the middle ear from alterations of pressure. It was interesting to note that in ascent there was a spontaneous opening of the eustachian tube which compensated for this, but in descent this was absent and voluntary swallowing became necessary to equalise the pressure. He classified fractures of the skull into those of the external auditory meatus, the mastoid, the walls of the tympanum and the petrous portion of the temporal bone. These last happened in probably 25% of cases of fracture of the skull and were usually due to blows or to a fall on the head; they also occurred, less commonly, through sitting down hard, so that the spine transmitted the force to the occipital bone, and from blows on the chin transmitted by the mandible. There were also independent fractures of the petrous bone and microscopic fractures of the bony labyrinth which broke up like an egg-shell.

Miss JOSEPHINE COLLIER, speaking of civilian injuries produced by aerial bombardment, based her remarks upon two visits to Barcelona where she had had an opportunity to talk with Dr. Raphael Trueta, the throat and ear surgeon to that city. When a foreign body was lodged in the external auditory meatus the mastoid or the face was the point of injury. It usually caused great pain, but sometimes might be missed owing to the severity of other injuries. She advised routine examination of the ear in all cases as soon as possible. Foreign bodies entering the middle ear were bomb fragments and usually small; other fragments might have entered the mastoid or the temporamandibular joint. Injuries of this region from big fragments did not reach hospital; the patients were dead. A foreign body needed removal only if it was producing some reaction, when the radical operation was necessary; but it should be as conservative as possible owing to the danger of meningitis. Treatment consisted in not being busy and in not putting in watery drops; it should result in there being no suppuration. Blood could be drained from the external meatus by laying the patient on the appropriate side. When the middle ear was full of blood, aspiration by a Siegel's speculum should be followed by closure of the meatus by cotton-wool.

Mr. V. E. NEGUS spoke from the experience of a department of a large E.M.S. hospital to which cases involving the head and neck were admitted. He said that ear injuries seldom happened alone; even with rupture of the tympanic membrane from blast, there were likely to be other effects such as cerebral hæmorrhage. He agreed on the importance of routine examination, and summed up treatment in the phrase "leave them alone." His cases were treated by mopping the

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skin round the meatal orifice twice daily with a solution of biniodide in spirit, care being taken to touch the superficial part of the meatus only. Moisture encouraged inflammation, so no drops were instilled and no wicks inserted, but a light plug of wool was put in after the cleansing. He did not attempt to remove wax or blood-clot from the deep meatus. Sulphapyridine was given in all cases. When the mastoid was involved it was not necessary to rush at it. Operation, if needed, should be done after two weeks or more. This was the opposite technique from that followed by otologists in the last war; and he ascribed the change to chemotherapy.

Mr. F. W. WATKYN-THOMAS said that the alternate waves of pressure and suction in blast could now be taken as proven. The petechiæ seen when no rupture of the drum-head was present were the result of the suction. He quoted a case in which the effect of pressure was seen on a mass of wax which had been driven so hard against the drum-head that on removal it retained the impression of the handle and short process of the malleus. Mr. W. M. MOLLISON, as another example of the result of pressure, told of a case resulting from an explosion in a factory in which he had discovered the incus in the mastoid antrum.

Mr. E. D. D. DAVIES disagreed with Miss Collier on the advisability of removing blood from the middle ear; judging by his experience of fractured skulls in civil practice, it disappeared rapidly by absorption.

Prof. HUGO FREY said that the shape of the perforation, as seen after some days, depended upon the direction of the fibres at the site of the original rupture, which was a slit and not a hole. Even a large perforation might be persuaded to heal after a long delay if the margin was slightly irritated so that the epithelium which had grown round the margin from skin to mucous membrane was removed. This might be done by rubbing it with a small mop of wool dipped in saline.

Mr. R. J. CANN pointed out that cracks of the drum-head seen in civil life from such things as a box on the ear were always linear splits. In blast injuries the same must happen from the wave of positive pressure; the succeeding negative wave tore the drum-head out thus giving rise to irregular holes.

SECTION OF LARYNGOLOGY

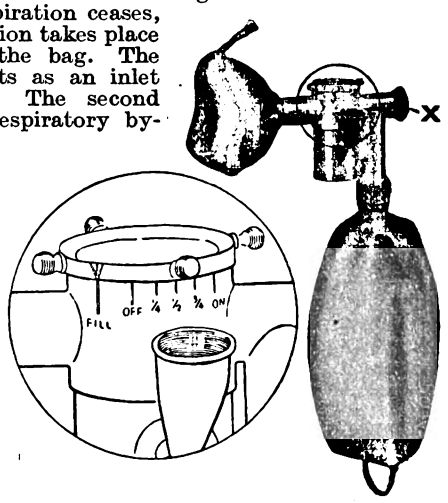
FOLLOWING the address by Mr. T. B. LAYTON, the president, on teaching in laryngology (reported in our last issue) a discussion was opened by Mr. F. C. W. CAPPS, who thought that the special surgeons should not attempt to take over any teaching from the physicians and surgeons in charge of the general departments, but that they should amplify, adopt and repeat such teaching. He suggested that additional beds in the general units should be allotted to cases from the special departments, the patients being admitted under the professors of medicine and surgery and cared for jointly by them and the specialist concerned. In this way the students would hear the cases examined from both points of view, and the surgeons in the special departments would be able to keep in touch with general medicine and surgery. Mr. E. D. D. DAVIES considered that undergraduate and postgraduate education could not be combined in the same institution. He advocated the use of rubber models of the ear and larynx and the examination of students one by another to compensate for insufficiency of patients. Mr. W. M. MOLLISON had no use for models, the students must examine patients; and the place for them to do this was the outpatient department. Prof. J. A. RYLE claimed still to be a general physician though he admitted leanings towards certain parts of medicine. He feared that the President depended overmuch on an objective approach on the part of the young doctor, but he was an advocate for the combined ward-round. Mr. NEGUS suggested that throat and ear surgeons should be called regional surgeons instead of specialists.

Mr. LAYTON said in reply that he supported the idea of the combined ward-round, and pointed out that this first arose at St. Bartholomew's with the once famous surgical consultations.

New Inventions

AN IMPROVED VINESTHENE INHALER

THE Oxford inhaler illustrated possesses two features which are not incorporated in Goldman's well-known inhaler. The first is a one-way inlet-valve (X) to allow inspiration of external air if and when the bag is empty. Respiration takes place normally into and out of the bag. Only if the bag becomes emptied does this valve come into action and the patient is thus never exposed to the suffocating experience of attempting to breathe from an empty bag. If the valve is brought into action it closes as soon as inspiration ceases, so that expiration takes place entirely into the bag. The valve thus acts as an inlet safety valve. The second feature is a respiratory by-pass which allows the vapour concentration to which the patient is exposed to be increased gradually. The by-pass overcomes the unpleasantness resulting from the "all-or-nothing" principle of administering anæsthetic vapours. By rotating the wheel control the concentration of vapour can be increased gradually from zero to maximum. Thus an excessive initial concentration of anæsthetic is prevented, and the risk of a patient resisting induction by coughing, crying or laryngeal spasm is avoided.



The inhaler was made for us by Medical and Industrial Equipment Co. Ltd., of 12, New Cavendish Street, London, W.1.

The illustration is reproduced from "Essentials of General Anæsthesia," by Prof. R. R. Macintosh and Dr. Freda B. Pratt, by permission of the publishers, Blackwell Scientific Publications Ltd.

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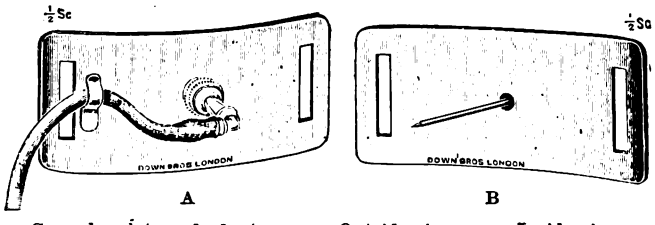
R. SALT.
Department of Anæsthetics, University of Oxford.

NEEDLE FOR USE IN SPONTANEOUS PNEUMOTHORAX

IN certain cases of spontaneous pneumothorax it becomes necessary to keep a needle fixed in the pleural cavity to prevent the rapid development of tension. Most pneumothorax needles are not well suited to this purpose, since it is difficult to attach them to the chest wall and they tend to be dislodged by the patient. The needle illustrated here was designed to overcome these difficulties, it consists of:



Cannula, plate and adaptor. A = Outside view. B = Inside view.

1. A short cannula provided with a sharp trocar and a blunt pilot. The cannula is 1¾ in. long and 1 mm. bore; this is a convenient size but it could be made of any length.

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2. A metal plate which can be strapped firmly to the chest wall. The cannula is passed through a hole in the centre of this plate into the chest, and is fixed in the desired position by means of a screw clamp.

3. A right-angled adaptor, one end of which plugs into the cannula while the other is attached to a length of rubber tubing.

The whole combination weighs very little and projects only a short distance from the chest. Should the cannula become blocked the adaptor is withdrawn and the blunt pilot is inserted to clear the lumen. The needle may be connected either to a simple water-sealed drainage bottle or to a continuous gentle suction apparatus.[1]

This needle was made for me by Messrs. Down Bros.

A. F. FOSTER-CARTER, D.M. Oxfd

Brompton Hospital.

Reviews of Books

Physiology of Micturition

By O. R. LANGWORTHY, L. C. KOLB and L. G. LEWIS, from the subdepartment of neurology and James Buchanan Brady Urological Institute, Johns Hopkins University. London: Baillière, Tindall and Cox. Pp. 232. 19*s*.

THE authors of this book have worked for several years on their subject, carefully repeating the classical experiments from those of Mosso and Pellacani of last century to those of Barrington in the last 25 years. They have, therefore, a solid basis of experience for evaluating their more strictly original contributions, many of which deal with the influence on micturition of the cortex and other parts of the brain. The book is comprehensive, and deals with the anatomical, pharmacological and clinical aspects of the subject, as well as with the physiological, but in many chapters there is little attempt to weigh evidence to the satisfaction of the reader. A wealth of facts and findings is provided, and conclusions are drawn, but we should often like to know the authors' train of thought in reference to a stated difference of opinion between two observers. This baldness is relieved by other chapters—for instance, the 12th contains much sound criticism of the too ready acceptance of antagonism between sympathetic and parasympathetic nervous systems. The authors point out that these innervate different structures, and they believe that opening of the "internal sphincter" is linked to the activity of the bladder wall mechanically rather than by any subtle interplay of reflexes. Considering the variety of subjects and problems brought under review, the book is Spartan in its dimensions. It gives the impression that its writers are high authorities on their subject but that they have set out to devote as little space as possible to their opinions and as much as possible to facts, though the latter are often derived from their own experiments. A lot more work has been put into it than is apparent from its size.

Neurosyphilis

By C. WORSTER-DROUGHT, M.D. Camb., F.R.C.P., physician to the Metropolitan Hospital and the West End Hospital for Diseases of the Nervous System. London: John Bale, Sons and Staples. Pp. 241. 10*s*. 6*d*.

THE management of syphilitic infections of the nervous system has been the concern of both neurology and syphilology, and it has suffered because the expert diagnostician and the therapist are so often out of contact with each other. But the experienced neurologist has found himself well able to treat neurosyphilis, while the physician in charge of a department of venereal diseases has hesitated to embark on detailed and often difficult neurological diagnosis. Dr. Worster-Drought has attempted to bridge the gap between the two groups of workers, and in so doing he has helped mainly the syphilologist, for the monograph contains little that is new or original and the twelve chapters dealing with the clinical and pathological aspects of neurosyphilis have their counterpart in any good textbook of neurology. The practitioner may improve his general knowledge of neurology from these chapters, but the one on treatment, which describes orthodox therapeutic methods with their disadvantages and alternatives, will appeal to him more. The less experienced reader will be dismayed by the perpetuation of such terms as "neuro-recurrence" and "colloidoclastic shock," and he will hardly recognise meningovascular syphilis under the cloak of "diffuse-cerebro-spinal meningo-vascular (or interstitial) neurosyphilis." Too much emphasis perhaps has been laid on nomenclature and classification in a disease whose boundaries are so vague.

While the book does not claim to be an authoritative and critical work of reference it will be found useful for general reading on a too often neglected subject.

Applied Physiology

(7th ed.) By SAMSON WRIGHT, M.D., F.R.C.P. London: Humphrey Milford, Oxford University Press. Pp. 787. 25*s*.

ABOUT a third of the figures in this edition are new, and the text embodies most of the advances in physiological knowledge since 1936. Like its predecessors it is a treasure-house of information for senior preclinical and clinical students. Cross-references, italics and footnotes are freely used and place the book in the category of those which teach as distinct from those which merely make information available. Prof. Samson Wright displays a little apprehension about increasing size, but few authors could compress the same amount of information into the same number of words, and the publishers could scarcely cram more into a page. Apart from the local emphasis there is little guide to what is and what is not of fundamental importance; only students who already know their way about the subject of physiology should use the book. As a solid bridge between physiology and medicine, with a beneficial action on each, the book maintains its primary value.

Legal Medicine and Toxicology

(2nd impn.) By T. GONZALES, M.D., M. VANCE, M.D., and M. HELPERN, M.D., medical examiners of the City of New York. London: D. Appleton-Century Co. Pp. 754. 50*s*.

SINCE this book appeared three years ago it must have won many adherents in this country. No book on forensic medicine and toxicology is more practical and comprehensive, and its great gallery of illustrations is almost all of the first water. The authors have had, between them, a vast experience in most branches of the subject. The sections on identification, infanticide and abortion still seem regrettably brief, and there is, of course, the inevitable difficulty over the law for 48 states. The lack of reference to the English law is natural, but in this country the book will be used not as a legal reference but for the undeniable excellence of its sections on the common practical aspects of the subject—death from natural causes and death from injury, including firearm wounds.

Ross and Fairlie's Handbook of Anæsthetics

(5th ed.) Revised by R. J. MINNITT, M.D. Edinburgh: E. and S. Livingstone. Pp. 364. 12*s*. 6*d*.

IN this edition Dr. Minnitt has added three new chapters to cover processes which have come into use since the last one. These deal with cyclopropane and closed-circuit absorption methods, with vinesthene, and with the therapeutic use of oxygen, helium and carbon dioxide. They tell the student all he needs to know about these subjects. As might be expected analgesia and anæsthesia in obstetrics are particularly well discussed, but the chapter on spinal analgesia does not seem full enough to give the student a thorough insight into the method; Etherington Wilson's technique, for example, is not mentioned. There are some other minor revisions necessary. The carotid body is not given the mention which it deserves from its now recognised place in respiratory regulation, morphine for young children is not ruled out by the most recent authoritative pronouncements, and the dosage of Nembutal given is below that usually recommended. These, however, are small matters compared with the all round virtues of the handbook, which include large clear print and plentiful illustrations.

1. See Marriott, H. L. and Foster-Carter, A. F. *Lancet*, 1940, 1, 122.

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IRELAND

BOVINE TUBERCULOSIS

No information has ever been available as to the extent of bovine tuberculosis among animals in Ireland, and until the recent study made by Dr. Cecil Mushatt there had been no attempt to discover the extent of human infection by the bovine type of tubercle bacillus. Dr. Mushatt, working with the aid of a grant from the Irish Medical Research Council, has now investigated this subject, and has summarised his findings in the October issue of the *Irish Journal of Medical Science* (p. 683). His conclusions have an important bearing on problems of public health as they affect Ireland. Material from the cervical glands, the bones and joints, and the meninges was studied in 50 children under 15 years of age. The series is admittedly small, but the sample appears to be as representative as possible, for while 27 of the cases were from Dublin city and county the remainder were from 12 other counties, including areas in each of the four provinces. In the cervical-gland cases 10 out of 14 yielded the bovine type, in the bone and joint cases 4 out of 22, and in the meningeal cases 3 out of 12; in 2 cases of primary abdominal tuberculosis the human type was found. Dr. Mushatt concludes that while human tuberculosis of bovine origin is only a relatively small part of the whole problem of tuberculosis in Ireland, nevertheless that form of tuberculosis causes a vast amount of suffering and ill health. The value of Dr. Mushatt's paper is increased by his discussion of methods of prevention, and his criticism of Irish legislation in so far as it concerns the control of the milk-supply.

A HOSPITALS SWEEPSTAKE

A further sweepstake in aid of the Irish hospitals, the thirty-first of the series, was conducted on Oct. 23. It resulted in a contribution to the hospitals fund of £10,075. The total sum which has been collected from the whole series is a little over £14,000,000. The sweepstake just concluded was confined in its operations to Ireland. At present the holding of the trustees is stated as £8,538,440. Approximately £1,500,000 of this is intended for the finishing of county hospitals and institutions, and the rest should go to the necessary additions to the voluntary hospitals and building of new ones, and to provide an endowment fund to meet future deficits. Last year the amount of deficits met from the fund is stated as £163,000. The date of the next sweepstake has not yet been fixed, but it is hoped that it may be possible to hold one in connexion with the Grand National next March. In the meantime a sweepstake is to be held in December in aid of the Irish Red Cross Society.

THE PEAMOUNT INDUSTRIES

Some ten years ago the committee of the Women's National Health Association of Ireland, with the helpful guidance of Sir Pendrill Varrier-Jones, established an industrial colony in connexion with its sanatorium at Peamount, co. Kildare. It was run on similar lines to the famous colony at Papworth but has not developed as was hoped, and the number of persons taking advantage of it appears to have dwindled in recent years. The committee found that in recent years it was losing an average of £500 a year, while only from 10 to 20 people were ordinarily employed in the colony. A few weeks ago the committee found itself compelled to decide to close down the industries section from the end of the year. This decision has roused a considerable amount of public opposition, mostly from people who had not previously taken any interest in the work of the colony or taken any trouble to inform themselves of the facts. Nevertheless, many regretted that an interesting experiment, and one which at one time promised well, should come to an end without careful study as to the possibility of continuing it without being too heavy a burden on a purely voluntary society. The industries have never received any financial help from the government or from the sweepstake funds. On Oct. 23 Senator James Douglas moved in the Senate that the Minister for Local Government and Public Health should be requested to appoint a departmental committee to inquire into the possibility of carrying on the industries. He argued that the question should not be regarded merely as one of finance, and that the view should not be taken that the industries must pay their way as a business undertaking. After some discussion the Parliamentary Secretary decided that the department would be willing to consider any representations that might be submitted to it by the Women's National Health Association and to make whatever investigation might be thought necessary. He consented to discuss with Senator Douglas the form which such investigation should take.

In England Now

A Running Commentary by Peripatetic Correspondents

EARLY one morning in September I received a telephone message to go at once to the hospital. I was not told what had happened, but was asked to approach with care. Much to my surprise (for the barrage and aerial bombardment were in progress) I succeeded in getting a taxi. It was an exciting drive, enlivened by my driver's speculations as to the sites of the various fires. "I reckon that's the Savoy 'otel, guvnor, or do you think it's the Cecil?" We were stopped by the police. "I'm taking this gent to St. Thomas's 'orspital," said my indomitable driver. "Sorry; you can't go," said the policeman. "I'm taking the gent to the 'orspital," persisted the driver, let in his clutch and off we went. At the St. Thomas's side of the bridge we ran into masses of masonry, and after bumping about a little my driver had to stop, saying "Sorry, you'll 'ave to walk the rest, guv'nor; I've done my best"; and so he certainly had.

When I arrived inside the hospital I found those of my colleagues who had been spending the night there looking somewhat shaken, which was not surprising seeing that most of them had been sleeping in the devastated area and had had their windows blown in and their beds covered with glass and ceiling. Desperate efforts were made to rescue some of the buried, and for several hours we hoped to save at least one of them who was alive when the tunnellers reached her after some hours of dangerous work. But unhappily she died before it was possible to extricate her.

During the night bombing continued. One of the wards was occupied by 25 gynæcological cases, most of whom had been operated on within the previous few days. Every window was blown in, and all doors blown off their hinges. Every bed was covered with glass, but by a miracle not a patient was scratched. The two nurses in the ward removed the glass-covered blankets from each bed, and put new blankets on every patient. Not a patient left her bed, and when the rescuers arrived the patients were all singing in the dark.

The following morning found us with no option but to evacuate all patients from the hospital. During the afternoon, however, by strenuous efforts on the part of the engineering staff, more water and electricity became available. The staff and governors unanimously decided to attempt to reopen the hospital, improvising wards in the basement and strengthening those on the ground floor. Two days later we were able to plan to open by the following week a total of 206 beds, including 57 in the basement. The bombing made the housing problem acute, and new accommodation had to be found for some 60 maids.

Soon afterwards some members of the consulting staff were with the resident medical officers in their room near the centre of the hospital. We heard the sirens, but there was no sound of gunfire or of aeroplanes. We went downstairs to take up our stations in the central hall of the hospital, which had been planned as a receiving room for casualties. I was sitting on a bench with four or five others and suddenly saw a vast sheet of flame some twenty yards from me, accompanied by a devastating explosion. Those of us who were not blown off the bench sat huddled up waiting for the roof to fall on us. Missiles, mostly large, hurtled all round us, but nobody was touched. For a moment or two after the explosion there was absolute silence. Then a man's voice said "Christ!" and a woman's, rather plaintively, "I don't think I am going to like this at all!" Then there was a babel of talking and shouting. We flashed our torches but they were almost useless in the dust and mirk of the explosion. We began to scatter, and a voice shouted,

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"Go carefully everybody—there may be no floor." For a time all was confusion. Our carefully made plans were wrecked in a moment. Our reception-room was devastated, our operating-theatre wrecked. Already men were bringing in casualties, and asking where to put them, and for a time nobody knew. Difficulties were increased by the darkness; one could not find one's colleagues; but in a remarkably short time order was restored. We went into the wrecked operating-theatre and grabbed everything we could lay hands on, carrying it out on stretchers, trays, tables, and in our pockets. Within an hour a new theatre had been improvised at the other end of the hospital, and a surgical team, complete with green overalls and masks, were busy operating. Like many others, I lost all sense of direction wandering about in the dark basement, where only occasional glints of a shaded torch were allowable, for aeroplanes were still busy overhead, and the barrage was in full swing. I remember breaking into various wrecked rooms, shouting but finding nobody, till I came on a fire at the end of the wreckage and beat a retreat. Fires broke out at each end of the wreckage, a biggish one at the dispensary end where many gallons of spirit got alight.

When we left the resident medical officer's room a house-surgeon and the assistant hospitaller stayed talking in the anteroom. The bomb actually passed through this room, utterly destroying it, and they were buried deep in the debris; in fact it was only by accident that one of the heroic rescuers discovered a knee sticking out of the debris, and digging down under this knee he found a face. It took an hour to dig these two men out, and this operation was the more dangerous because of fractured gas mains in the wreckage, quite close to the fires which were blazing at each end of it. The house-officer sustained a fractured skull, and the padre cuts and bruises only. Both have made good recoveries.

Another house-officer had a miraculous escape. He came down to the central hall with us, but went back for his tobacco pouch. He heard the bomb as he was going up the stairs, and jumped round a corner, so probably saving his life. The blast blew him downstairs, and he alighted on the main corridor as it subsided into the basement. He was uninjured, though bruised and shaken. Unhappily we lost one nurse, killed, a woman A.R.P. worker who died of wounds, and two house-officers, killed; while a number were more or less seriously injured. By about 10 o'clock all the injured had been dealt with, and there was not much to do except to wander round the basement wards and see that everyone was all right. It was a long and trying night. The whole habitable part of the hospital basement was packed, and in almost complete darkness; the drone of the German aeroplanes was almost continuous, as was the noise of the barrage and of exploding bombs. In peace-time our psychologists had warned us to be prepared to have the hospital stormed by screaming people, and to have outbreaks of hysteria in the wards themselves. In point of fact not one whimper or lamentation was heard from start to finish.

* * *

I got home at about 7 A.M. that morning, as black as a sweep, and a hot bath was very pleasant. By the following evening our magnificent works and engineering staff had once more succeeded in restoring full services. No central heating is available, but food is provided from the students' club on the opposite side of Lambeth Palace Road. Outpatients are seen on the ground floor. Urgent cases are admitted, and for less urgent cases requiring inpatient treatment admission is arranged in one of the affiliated sector hospitals under the E.M.S. A new home has been found for the medical school in Surrey. Within a week our energetic school council took over an empty girls' school there, and another big house on an adjacent piece of land. Laboratories have been equipped for the teaching of anatomy and physiology, and by the kindness of the governors of a famous school their laboratories are available for the teaching of chemistry and physics. Our students are well housed in beautiful surroundings, and one feels that when the time comes to bring them back to London they may not altogether welcome the change. We are busily negotiating to obtain one of the sector hospitals as a new home for the hospital itself. Obviously no rebuilding can be attempted in war-time, and it is also evident that the rebuilding and reconditioning of the whole hospital may occupy two or three years after the war is ended. But we older men all feel that the self-sacrifice, courage and fine spirit shown by the younger generation during the time of trial will ensure that the new St. Thomas's will be worthy of the old.

* * *

I have been turning over the pages of two medical journals printed in Berlin towards the end of September and have been trying to picture what medical life is like in Germany now, but I fear without much success for the *Deutsche* although it retains its blue cover—already lost at this stage of the last war—contains little local colour. Out of the 26 pages of text not even a whole page is given to the *kleine Mitteilungen* (the little matters of medical life and politics). It makes one wonder what the present editors do. One of the late editors when he lunched at my club some years ago told me he only spent three or four half-days a week on the paper and did not go down to the office every day. His chief interest lay elsewhere, for he was covetous of the brass things hanging on the smoking-room wall of which he was evidently a connoisseur. He lost his job soon after, poor chap, on racial grounds. Although paper may be plentiful—especially for inset advertisements which are almost exotic—there seems to be some shortage of general practitioners, for a rather sharply worded memo speaks of doctors who leave their insurance practices without giving proper notice, thereby spoiling the orderly plan for treatment of the civilian population. To meet the difficulty of crowded consulting-rooms in Berlin some of the panel doctors are to make regular outpatient tours. There is also a shortage of midwives and local authorities are asked to make it easy for suitable women to take up training provided they bind themselves to practise in the place for not less than 5 ensuing years. Some small items are of ephemeral interest. For instance, the travelling hospital of the German Red Cross, after assisting German refugees from Volhynia, and then Belgian and French refugees in the west, is now at Belgrade caring for Germans returning from Bessarabia. A pleasant feature is a little note on Professor Anschütz's seventieth birthday. But can it be puckish humour that prompted the editor to fill a tiny blank space on his page of health-resort advertisements with a notice of Gruhle's new book on suicide? And I ask myself what is the significance in the choice of *Misserfolge* (failures) for the section entitled Varia and of the quotation from Paul Römer "Whoso would build his life solely on his own merit has nothing to expect from his fellow men," or Vaihinger's remarkable epigram "Truth is only the most expedient error."

* * *

My young friend, the flight lieutenant, was recently invited to join a shooting party on the old colonel's estate, not far from his aerodrome. He was not very experienced with a shotgun, but he is always willing to try a thing once. The first flight of birds came over between the Colonel and the Admiral, and for fifteen exciting seconds civil war ensued as the Colonel and the Admiral pinched each other's birds. But his letter shall tell the story: "We then moved on to the next field, when a bird got up on the right, between mine host and B, who is my squadron leader. Mine host missed it and B knocked it down. That left just me, and I determined that the next thing that moved would be riddled before it had its undercarriage up. Hardly had we gone ten yards when a heavily laden pheasant got up somewhere between my feet and made for the hedge behind me. I whirled round, and just as it completed its second flap I let fly with one barrel and was astounded to see the unfortunate aged bird do a nose dive and crash. My pride in bringing him down was considerably damped when B whispered in my ear, 'The idea, old man, is to shoot these birds; not blow them to bits.'"

* * *

There was a young surgeon of Piedmont
Who healed his new wife by débridement.
He missed what his bride meant
When she talked of debridement
But he murmured politely "évidemment."

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THE LANCET

LONDON: SATURDAY, NOVEMBER 16, 1940

FLOTSAM AND JETSAM

EXTENSIVE experiments by himself and his colleagues on the transmission and infectivity of bacteria in air and in moist droplets led CARL FLÜGGE (1847–1923) to promulgate the view that certain respiratory infections—he instanced diphtheria and whooping-cough—are contracted almost exclusively by intimate and immediate contact with droplets expelled by an infective patient in talking, coughing or sneezing. He believed that the effective range of these droplets after coughing was not more than three or four feet, so that, for example, a susceptible person would have to remain for 24 hours within four feet of a tuberculous patient if he was to run any appreciable risk of becoming infected. He did not, however, deny that other infections, such as the acute exanthemata, might be spread to a distance by air-borne dried particles. Unfortunately present-day practice often uses "droplet infection" and "air-borne infection" as synonymous terms, but if progress is to be made in the prevention of respiratory infections it is essential that the differences between these two methods of spread should be clearly understood and defined, even if there is an ill-defined borderline. Droplet infection, in the sense that FLÜGGE used it, is the direct spread of infection by moist droplets to persons within a radius of three to four feet, while air-borne infection includes the transmission of infection to greater distances either by very fine droplets which remain suspended in the air to be carried hither and thither by air-currents, or by dried infected dust-particles raised into the air and similarly transported. Thus, droplet infection might be likened to rain falling through the air, and air-borne infection to mist suspended in it. It would perhaps make for clarity if the former were called "projectile" and the latter "floating" infection.

Droplets expelled in talking, coughing and sneezing are obviously not all of uniform size; there are coarse droplets that fall quickly to the ground to infect the dust, and these are probably seldom responsible for the direct spread of infection; the majority are smaller—1 mm. or less in diameter—which can be inhaled, and infect directly; and there are droplets 0·1μ or less across which according to WELLS are so small or quickly become so by evaporation that they remain suspended in the air like smoke, the so-called droplet-nuclei. The part which these droplet-nuclei play in initiating infection will depend on their viability in air, on the infective dose of the bacterium or virus contained in them, and thus indirectly on their total number in the air. To take concrete examples, chicken-pox is certainly spread by droplet-nuclei, and, because the infective dose of the causal virus is very small, the concentration required to initiate infection is also very low. On the other hand, there is no direct evidence that scarlet fever or diphtheria can be spread by droplet-nuclei although their materies morbi is often air-borne in dust-particles, but if droplet-nuclei do play a part in the transmission of these infections a much higher concentration of them would probably be required because of their low infectivity.

These considerations have an important bearing on any attempts to prevent respiratory infection. It has been estimated[1] that the "muzzle velocity" of droplets expelled in a sneeze—and the camera has demonstrated conclusively that they come mostly through the mouth, not the nose—is as great as 150 feet per second, so that no physical or chemical aerial disinfectant such as ultraviolet light or germicidal aerosol can prevent projectile or direct droplet infection. Indeed, WELLS, WELLS and MUDD[2] have suggested that the sneeze seems to be a provision of nature for the survival of nasopharyngeal parasites. Obviously, only some system of masking can prevent droplets being thrown out and the mask has already proved its worth in the prevention of streptococcal puerperal sepsis, and, as some believe, in the control of influenza.[3] If the spread of infection in overcrowded shelters is, as seems likely, principally and primarily by droplets, then cheap and efficient masks will be needed, and, what is more important, the public must be educated by propaganda to use them.

MISUSE OF TANNIC ACID

WHEN tannic acid was hailed a few years ago as the perfect dressing for burns there seemed to be no pitfalls to avoid, no circumstances in which its use could prove disastrous. Yet at a meeting of the Royal Society of Medicine last week (reported on p. 621) all speakers agreed that tannic acid must never again be used for burns of the hands and face. The immediate results of treatment may be good in some ways: the coagulum protects the injured area, reduces exudation, and prevents sepsis, but it also produces gross crippling of the hands, and by immobilising or deforming the eyelids endangers the eyes. Rear Admiral C. P. G. WAKELEY, Mr. A. H. MCINDOE and others showed the evolution of these grave end-results by photographs. Tanning of third-degree burns of the hands hinders the already impaired circulation and leads to œdema which, by compressing the vessels to the fingers, causes necrosis of the phalanges. When healing finally occurs the mutilated fingers are dragged backwards by scar tissue and a useless claw replaces what should have been a functioning hand. The results of coagulation treatment on the face may be even more distressing. The eyelids, fixed by horny tan, cannot be moved for a matter of days or weeks; thus in the early stages a damaged eye may be out of reach of treatment, and in the late stages contractures and ectropion leave the cornea exposed to injury and infection which may even destroy sight. These are disasters which must be avoided in future. Mr. MCINDOE would have no third-degree burn, whatever the site, treated by coagulation. On the face and hands such burns must be treated by skin grafts as soon as the granulating surfaces can be suitably prepared. Elsewhere large denuded areas, after saline-bath treatment, can receive pinch or Thiersch grafts. Apart from baths, irrigation is being tried with saline containing electrolytic hypochlorite, run into a Bunyan-Stannard oiled-silk envelope which encases the limb.

1. *Publ. Hlth Rep., Wash.* July 19, 1940, p. 1315.
2. Wells, W. F., Wells, M. W. and Mudd, S. (1939) *Amer. J. pub. Hlth*, 29, 863.
3. Sanderson-Wells, T. H. *Times*, Oct. 21, 1940.

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This method is still in the experimental stage. Baths are painless and overcome sepsis quickly so that the granulating area becomes suitable for pinch or Thiersch grafting. Sulphonamides are also proving useful in the local treatment of infection. In the Navy and R.A.F. a jelly containing gentian violet 1% and Merthiolate 1/5000 has now been substituted for tannic-acid jelly as a first-aid application. It seems urgent to provide a similar first-aid dressing at once for A.R.P. wardens, first-aid parties and others who come into early touch with casualties. At present these workers are instructed and encouraged to apply tannic-acid jelly to all burns, and are supplied with tubes of it as part of their first-aid equipment.

CHEMOTHERAPY INSIDE THE BOWEL

IN their attempts to discover an efficient intestinal antiseptic both the experimentalist and the clinician have so far had to admit defeat. For example, in the pre-sulphanilamide era, GRAHAM [1] tested a large series of antiseptics belonging to the anil and styryl quinoline groups, as well as proflavine, hexylresorcinol and the silver thioglycerol sulphonate which LUMIÈRE claimed had almost sterilised the intestinal contents of a dog. All these preparations were powerfully bactericidal to the colon bacillus in vitro and were relatively non-toxic, yet when they were fed or given by stomach-tube to mice under carefully controlled conditions they produced no appreciable change in the intestinal flora of these animals. With the advent of the sulphonamides fresh attempts were made, but most of the experimental investigations aimed at proving the value of these drugs on mice infected *intraperitoneally* with different members of the salmonella and dysentery groups of organisms.[2] Since these experimental infections in no wise simulated the natural disease the results were little more conclusive than those obtained from the test-tube. Clinically there have been very few reports on the use of the sulphonamides in intestinal infections, although HARRIES, SWYER and THOMPSON [3] claimed some success with sulphanilamide and sulphapyridine in a small series of cases of typhoid fever.

Instead of using insoluble substances MARSHALL and his colleagues [4] in Baltimore have suggested that an intestinal antiseptic should be readily soluble in water but poorly absorbed from the intestine, so as to give a high concentration of the antiseptic in the bowel and a low level in the blood and tissues, a situation somewhat analogous to the use of the sulphonamides as urinary antiseptics. With this objective they prepared a variety of sulphonamide compounds, of which sulphanilyl-guanidine appeared to be the most suitable for further tests. They give a full description of the preparation and chemistry of this substance, and have carried out extensive tests on its pharmacology and toxicity in mice, rabbits and dogs. The drug is poorly absorbed from the gut, and mainly by the small intestine, and the absorbed portion is quickly excreted. Acetylation occurs, as with other members of the series, and the conjugated compound is probably concerned in the toxicity of the drug on the kidney. The authors believe from their tests that the toxicity of sulphanilyl-guanidine is of the same order as that of sulphapyridine or sulphathiazole, and maintain that with reasonable care the risk of toxic effects will be small because so little of the drug is absorbed. It is as effective as sulphapyridine against pneumococcal infection in mice and rather less active than sulphanilamide in experimental streptococcal infection. Its most remarkable property is its bactericidal action on the coliform organisms in the mouse intestine. If this activity extends to the intestinal pathogens the drug may prove most valuable in the treatment of infections localised mainly or entirely to the intestine, such as bacillary dysentery and cholera. In the absence of comparable experimental infections its usefulness may have to be proved by clinical trial.

1. Graham, J. G., *J. Pharmacol.* 1932, 46, 273.
2. Buttle, G. A. H., Parish, H. J., McLeod, M. and Stephenson, D. *Lancet*, 1937, 1, 681.
3. Harries, E. H. R., Swyer, R. and Thompson, N. *Ibid*, 1939, 1, 1321.
4. Marshall, E. K., Bratton, A. C., White H. J. and Litchfield, J. T. *Bull. Johns Hopk. Hosp.* September, 1940, p. 163.

LEPROSY AND THE HAMSTER

THE striking resemblances between leprosy and tuberculosis have often been commented on, but the contrasts between these two diseases are no less marked. Chief among these contrasts is the scanty success which has so far attended attempts to culture *Mycobacterium leprœ* in vitro and to reproduce progressive leprosy in other than the human genus. Among the more promising attempts at animal inoculation were those of ADLER [1] who, by implanting small pieces of leprous nodule in two splenectomised Syrian hamsters and later inoculating macerated leprous material intraperitoneally, obtained evidence of multiplication of the bacilli. In one animal, killed a week after the inoculation, he found gross lesions full of bacilli at sites distant from the point of implantation. ADLER demonstrated his results at the Industrial Leprosy Congress at Cairo in 1938, and the impression of many of those present at the congress was that disease similar to human leprosy, progressive at least to a point, had been produced. ADLER has however failed to carry on the disease through a continuous series of hamsters. BURNET [2] in 1938 obtained in 1 out of 6 inoculated hamsters what he considered to be definite signs of progressive disease, the animal being killed four months after a second inoculation with leprous material, given intraperitoneally. The results of these two workers produced at the time considerable hope that an experimental animal had at last been found which would facilitate the study of leprosy.

The experiments of ADLER and BURNET have now been repeated in India on a larger and more prolonged scale by DHARMENDRA and LOWE.[3] They attempted to infect 23 Syrian hamsters (13 of which had been previously splenectomised) with human leprosy material. In 10 the material was inoculated intraperitoneally and in 13 it was implanted in the abdominal wall. Lest climate should prove a determining factor one batch of animals was kept in Calcutta and the other in the comparative cold of a Himalayan hill station. Out of the whole number, 6 died in three weeks and 2 lived eight months; the remaining 15 were killed between the ninth and twelfth months. Slight microscopic lesions and bacilli were found elsewhere than in the implanted nodule in only 2 out

1. See *Lancet*, 1937, 2, 714.
2. *C.R. Acad. Sci., Paris*, 1938, 207, 690, and see *Lancet* 1938, 2, 1306.
3. *Indian J. med. Res.* 1940, 28, 1.

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of the 23 animals, and these 2 animals had died three weeks after inoculation. No lesion apart from that at the site of the implanted nodule was found in animals dying or killed after three weeks, though in 2 of the latter a few bacilli were found (once in a gland and once in the omentum). Bacilli were more often found in animals examined early (3 out of 6) than in those examined later (1 out of 17). In 9 of the 13 animals in which the nodule was implanted in the abdominal wall masses of bacilli were found at the site of implant, but these masses were not larger than those originally introduced. These workers conclude that although bacilli can persist in the implanted nodule for long periods, and although the possibility of their multiplication in such implants has not been disproved, the inoculation of Syrian hamsters by this method or by intraperitoneal inoculation has not been followed by a generalised or progressive infection. They point to the progressive diminution in the number of bacilli found in direct proportion to the length of the period between inoculation and examination, and suggest that the findings of ADLER may have been at least partly due to killing the hamster early; they might have appeared less favourable if the examination had been made later than one week after the last inoculation.

In BURNET'S experiment this explanation is not equally applicable, as in the successful instance the animal was killed four months after the last inoculation. Were the bacilli found in the liver, spleen, and nodes simply carried mechanically from the original site? If so, BURNET asks, why were no bacilli found in the other 5 hamsters; does this not prove that the successful hamster was more susceptible to the disease than the others? It certainly appears to indicate, like the experiments of ADLER and of DHARMENDRA and LOWE, that in some hamsters the bacilli are more slowly eliminated from the body than they are in others. The evidence suggests several points which might be kept in mind by those making experiments in future. For example, the massive concentration of bacilli found in leprous nodules may later give the false impression, when inoculated animals are examined, that the bacilli must have multiplied; lepra bacilli persist for long periods after being inoculated in experimental animals and this persistence varies considerably in different animals. Again dead bacilli may cause local tissue reactions and pathological appearances somewhat similar to those produced by living bacilli. It may be accepted that the only safe criterion of successful inoculation is the passage of the disease through an indefinite series of animals.

SIR ARTHUR MACNALTY'S RETIREMENT

IT is five years since Sir Arthur MacNalty succeeded Sir George Newman as chief medical officer of the Ministry of Health and the Board of Education. They have been momentous years, crowded with urgent problems and historical events, and during them two departments of state have been secure in the knowledge that their health services were in charge of a man with a broad grasp of affairs, a first-hand acquaintance with public-health routine, and a catholic approach to state medicine. The services have had a chief who was always accessible and conciliatory. And the public has had an expositor in simple language of the essentials of healthy living. All who have worked with and under him will remember his friendly personality and will wish him in good measure enjoyment of the kindly fruits of retirement.

Annotations

DEBRIDEMENT

Charles Mayo was once working on a difficult job round the common bile-duct when he was hailed from the gallery: "Say doc, would you settle an argument for us? What is the correct pronunciation, appendicitis or appendiceetis?" Mayo deliberately packed a few swabs down to the site of dissection, laid a sterile towel over the wound, put down his instruments, and turned to his questioner. "You know, doctor," he said, "you have raised a question that has long worried Will, Donald, and myself, so that we had to bring it before a staff meeting last week. After hearing all the evidence on both sides we decided that where the leading symptom is pain in the side the disease is to be indexed as appendicitis, but where the patient first complains of pain in the seat it is to be appendiceetis." The story illustrates two traits of the great Charlie, his contempt for those who worry about words rather than surgical principles, and his ability to administer a rebuke kindly but with complete finality.

Surgery, a neutral by inclination, has been drawn into the world war over the meaning of the term *débridement*. *Débridement* has become a commonplace in the literature of war, and is used almost without thought by British writers. Those who never got beyond estaminet French are apt to think it has something to do with debris, whereas it should mean the removal of a bridle, otherwise the relief of tension. More important than what it ought to mean is what it does mean—how it has been used in surgical literature since it first became an abbreviation for surgical procedure, and in what meaning it serves the most useful purpose. The Napoleonic surgeons used *débridement* in their writings to mean very much what we mean by drainage today, but they used it as part of descriptive language and not as a technical expression. In the last war, after an experience of wound infection that appalled the surgeons of all armies, a technique was evolved that abolished the worst manifestations of sepsis, of which no single word or even single sentence was descriptive. The procedure was in the main excision, but excision with a certain purpose and with definite limits in time and extent. Its purpose could be described as surgical sterilisation of lacerated and contaminated wounds, its time limits as that period varying between 4 and 24 hours in which the bacteria are still confined to the wound track, its limitations in scope as those dictated by the impossibility of sacrificing vital or important structures. This balanced and purposeful excision was denoted *débridement et nettoyage* by Carrel, but other French writers used *débridement* alone, and this practice was adopted by British writers. That interpretation has remained, and later writers on war topics—Trueta in his book on the Spanish war, Mitchiner on air-raids and Ogilvie in our primer on wound infection—have used it without question in that sense. Others, anxious to guide the spate of war literature that threatens to descend on us into its proper channels, are concerned with this misuse of the word, and would have us return to its original meaning.[1] If the meaning of words and the usages of language could be influenced by an appeal to history or fixed by the decisions of authority they would prevail, but the living tongue obeys only those laws that govern the development of all live things, seeking always fresh channels and fresh outlets, growing under the guidance of natural selection. New words and new phrases constantly arise and old ones take on new meanings. Words taken from the speech of other nations acquire a new sound and an altered significance. Whether innovations remain or not is decided not by

1. See correspondence columns of the *British Medical Journal*, Sept. 28–Nov. 9, 1940.

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professors of language in conference but by the whims of the man in the street, not because their derivation is impeccable but because they do their job better than their predecessors. So it must be with *débridement*. If it means relief of tension, as undoubtedly it does or rather did, do we need it at all? Is one long French word better than three short English ones? Does it say anything new or describe anything old more clearly, more concisely or more beautifully? If on the other hand it means all the steps of surgical wound sterilisation elaborated in the last war and practised, possibly with modifications, in this, as it undoubtedly did to the surgeons who developed that technique and to the majority of those who use it today, it becomes a useful and indeed an indispensable word. It saves time in writing and unnecessary repetition of technical details to those who are already familiar with them.

These points will be settled eventually by the consensus of surgical opinion, and settlement will come easier and sooner if we admit that the word is no longer French, but has become part of the vocabulary of British surgeons. Let us remove the accent and drop the italics. As debridement it is our word, one that we can pronounce as we like and use to convey the meaning for which it is most needed without reference to the dictionary.

ORIGINS OF HEADACHES

Penfield[1] originally followed up the work of Foerster and others who have studied the mechanism of headaches by stimulating the exposed brain, dura, and intracranial blood-vessels and noting the resulting sensations. Now, with McNaughton[2] he has investigated the anatomical background of his previous clinical and experimental observations. He found that the brain itself and the intracerebral blood-vessels were insensitive, but that the walls of the dural sinuses, the large intracranial arteries, and some areas of the dura were extremely sensitive. Pain produced by dural distortion—that, for example, due to pressure upon the falx and tentorium—was referred to a distance from the point of stimulation, while stimulation of the larger arteries caused local pain. Some areas of the meninges were more sensitive than others—for instance, stimulation of the posterior third of the falx caused severe pain, and the walls of the sinuses and points of entry of veins had a much greater sensitivity than the rest of the dura. Whether pressure, traction, heat, or electricity were used as stimulants the resulting pain had always the same quality; it was, in fact, a headache, and was sometimes accompanied by nausea, vomiting and restlessness. The reference of the headache following local stimulation was usually ipsilateral, but was often far removed from the point of stimulation. For instance pressure upon the tentorium or upon the posterior part of the falx caused a frontal headache. The reference of this pain is explained by the anatomy of the nerve-supply of the cerebral dura mater, which is all, except for that in the posterior fossa, supplied by the trigeminal nerve. Fibres from the second and third division, and sometimes from the first, pass up with the middle meningeal artery to supply the lateral cranial walls, while the superior longitudinal sinus and falx are innervated mainly by the ophthalmic division via the tentorial and anterior ethmoid nerves. The tentorial nerve also supplies the superior wall of the transverse sinus, but its inferior surface and the dura of the posterior fossa receive a nerve-supply from the vagus, and also perhaps from the ninth and tenth cranial nerves. Although much of this area is very sensitive, nerve-endings are difficult to find, and their number varies from case to case. This may explain the wide individual variation found in the sensitivity of these structures.

Penfield and McNaughton also describe a series of cases where pain related to dural scars or deformity was relieved by denervation of the dural sinuses or by section of the appropriate division of the trigeminal nerve. They conclude that although headaches have been attributed variously to irritation of the dura, the meningeal and cerebral arteries, and the ventricular walls, the dura with its sinuses and tributary veins is the commonest site of origin. They suggest that treatment of intractable headache should not be abandoned until the pain mechanism has been studied in each case, and radical treatment has been undertaken to remove the local cause or, if necessary, to section the appropriate sensory nerves.

EXTERNAL HYSTEROGRAPHY

FOR many years obstetricians have been studying the action of the uterus in labour both from a physiological and a pathological standpoint. Most of this work has been done by careful clinical observation, but from time to time the aid of scientific recording instruments, of greater or less accuracy, has been invoked. The first hysterography studies are credited to Schatz[1] who introduced into the uterus a small rubber bag of 80 c.cm. capacity connected to a revolving drum. Chassar Moir[2] used this method to assess the action of the ergot alkaloids on the uterus, and thereby established the value of ergométrine. This internal method, has, however, four major disadvantages. First, it is a foreign body, and like any foreign body introduced into a hollow viscus may set up unnatural contractions. Secondly, any foreign body introduced into the upper reaches of the birth-canal must, no matter how skilful the operator and how ideal the aseptic ritual, carry with it at least a small risk of infection. Thirdly, its introduction needs an anæsthetic which may itself influence uterine behaviour. Lastly, the use of internal apparatus requires an elaborate technique of sterilisation, skilled assistance and attention. These manifest disadvantages have led to the increasing use of an apparatus which is entirely external, first devised by Schaffer in 1896. This method is not ideal, since the record must take into account various extraneous movements such as abdominal respiratory excursions, aortic pulsation transmitted through the uterus, vomiting, and in fact any movement of the patient; but these superimposed tracings are easily distinguished from the orderly sequence of the uterine contractions. A levered cork hammer is applied to the maternal abdomen by means of a circular base which carries a pneumatic chamber; the hammer is connected to a rubber diaphragm in the pneumatic chamber, so that any excursion of the hammer is interpreted via a recording tambour on a smoked drum. When the uterus contracts the anteroposterior diameter of the uterus and the abdomen increases; this results in an upward deflection of the hammer and compression of the air in the closed system, producing an upward stroke on the drum. The whole apparatus is light and rides comfortably on the patient, who is thus permitted a fairly wide range of normal movements. Mostyn Embry[3] has used this method to illustrate the effect of various drugs, notably in cases of inertia. He finds that gas administered by Minnitt's apparatus does not depress uterine contractions but enhances the intensity of individual contractions and increases the tone of the uterus; even when administered in concentrations sufficient to produce anæsthesia it has little or no depressant action. Ether used as an analgesic does not depress uterine action or retard labour, but when pressed to the point of anæsthesia the intensity of contraction is lessened and the interval between contractions is lengthened in direct proportion to the depth of the

1. Penfield, W. *Ass. Res. nerv. ment. Dis. Proc.* 1935, **15**, 399.
2. Penfield and McNaughton, F. *Arch. Neurol. Psychiat.* July, 1940, p. 43.

1. *Arch. Gynaek.* 1872, **3**, 58.
2. *Proc. R. Soc. Med.* 1935, **28**, 1654.
3. *J. Obstet. Gynæc.* August, 1940, p. 373.

anæsthesia. Chloroform in small doses has the same effect as ether, but in larger doses acts as a more powerful and complete uterine depressant. Bromide and chloral, he finds, have no effect on uterine action and any improvement in the action of the uterus after their use he attributes to their sedative effect on the higher centres. Morphine acts in the same way except that 15 min. after the injection of gr. ¼ there is a slight but noticeable diminution in the intensity and frequency of the contractions; this is a transient phenomenon, lasting only 30 min. at most, and not influencing the subsequent behaviour of the uterus. The action of morphine with scopolamine is the same as that of morphine only. He also investigated the oxytocic drugs and found that quinine in gr. 10 doses is an unreliable stimulant. In four patients on whom tracings were secured only one showed improved contractions. Pituitrin on the other hand has a dramatic effect on the parturient uterus; acting rapidly, it increases the power, frequency and duration of the contractions, but relaxation between contractions is incomplete; in other words, a state of partial tetany is induced. The duration of this action is about 30 min. even with small doses of 2½ units. These hysterographic studies of the effects of pituitrin once again confirm the grave dangers of its indiscriminate use, the gravest being that of rupture of the uterus. Hysterography failed to show any demonstrable difference between pitocin, the separated oxytocic principle of pituitrin, and pituitrin itself. Thymophysin is variable in action, and shows no particular advantages over pituitrin. Œstrin and acetylcholine have a variable effect on the parturient uterus: in some cases a definite increase in contractions results quite soon after their administration, though this is never so dramatic as after pituitrin. Embrey's work confirms some and repudiates others of our established theories of uterine behaviour in labour, and the action of stimulant and depressant drugs on the contracting uterus. Hysterography should provide a reliable measure of old and new therapies.

ANTISCORBUTICS

ANIMAL tissues are valuable sources of the fat-soluble vitamins, but, with a few exceptions of secondary practical importance, plant tissues are essential to man for his supply of vitamin C. It is a fallacy, however, to consider that all plant tissues are equally important antiscorbutics, and consideration of tables such as those compiled by Boas Fixsen and Roscoe[1] reveals the great variation in vitamin-C content of various fruits and vegetables. The negligible amount of the vitamin in plums, pears and melons is in striking contrast to the high concentrations found in many other fruits and vegetables. Citrus fruits have been accepted for some long time as valuable antiscorbutics, but it was not until 1936 that it was shown[2] that black-currants were three or four times as potent as orange juice. Two-thirds of an ounce of black-currants will provide the entire estimated daily dosage of 50 mg. of ascorbic acid. The strawberry also now ranks with the citrus juices and is approximately twice as rich as the tomato. Alongside this revision in the scale of accepted antiscorbutic values other false impressions have been corrected as the result of recent investigations. Vitamin C was once regarded as a luxury vitamin restricted to those who could afford the more expensive fruits. But price and antiscorbutic value do not necessarily run side by side and about 1½*d.* a day spent on properly chosen foods will supply the normal requirements of vitamin C.[3] Another common fallacy was that cooking and canning of fruits and vegetables destroyed most if not all the vitamin C present. Workers throughout the world—Kohman and Tressler in America, Lunde and Mathiesen in Norway, and Olliver in England—have disproved this theory. During cooking a proportion of the vitamin is extracted from the tissues into the liquid but the actual destruction is relatively small. Cooked, but not overcooked, vegetables such as brussels sprouts, cauliflower, cabbage, and spinach are among the most valuable antiscorbutics but it is a pity more use cannot be made of the despised water they have been cooked in. These new findings, which are of the utmost importance in time of war when the nation has to be fed on a restricted food-supply, are based on a mass of experimental work mainly accumulated during the past five or six years. As the *Journal of the American Medical Association*[4] points out, these many observations have only been made possible by the perfection of rapid chemical methods for estimating the vitamin, and the importance of the work of Tillmans, Harris, and others, by which a simple 30-minute test can be substituted for a laborious three to four weeks' biological assay, cannot be overestimated.

1. Boas Fixsen, M. A. and Roscoe, M. H. *Nutr. Abstr. Rev.* 1937, **7**, 823.
2. Olliver, M. *J. Soc. chem. Ind., Lond.* 1936, **55**, 153T.
3. Olliver, *Lancet*, 1940, **2**, 190.

POLIOMYELITIS OF MICE AND MEN

IT is too early to attempt to classify animal viruses with the precision applied to bacteria, but it is possible to place them in groups. These include the vaccinia-variola group, the Castaneda-positive group (made up of the viruses of psittacosis, trachoma, inclusion conjunctivitis and lymphogranuloma venereum), the influenza group and so on. It may now become necessary to speak of a poliomyelitis group. In 1934 Theiler[5] while working in New York on the effects of the neurotropic yellow-fever virus in mice noted that a few uninoculated mice from an apparently normal strain showed symptoms of a flaccid paralysis of the hind legs. From the brains of these mice a virus was isolated which is similar in size to the poliomyelitis virus and like it gives rise to lesions which affect especially the cells in the anterior horn of the cord.[6] A number of strains of this virus have been isolated not only in America but in Germany, Japan and Palestine. Olitsky[7] has now found that the same virus is carried in the intestines of a high percentage of normal mice in America, although few develop nervous symptoms. From the intestine the virus can be traced, according to Theiler and Gard,[8] through the intestinal wall to the mesenteric glands. Monkeys are resistant and do not develop immune bodies after inoculation with the mouse virus nor is there any serological relationship between it and human poliomyelitis virus. These observations might appear to have little bearing on human pathology were it not for the discovery by Armstrong[9] that the Lansing strain of human poliomyelitis virus is transmissible to the Eastern cotton-rat, *Sigmodon hispidus hispidus*, and to the mouse by intracerebral injection. The lesions in these species closely resemble those found in the monkey (Lillie and Armstrong[10]). After passage through the cotton-rat the Lansing virus was shown by Peers[11] to have undergone no change in its pathogenicity for the rhesus monkey; and Haas[12] found that 57 of 83 human sera possessed immune bodies to this virus, as judged by the reaction in mice, whether or not the donors of the serum had a clinical history of poliomyelitis. The susceptibility of the Eastern cotton-rat to the Lansing strain of human poliomyelitis was confirmed by Toomey and Takacs,[13] who also infected the closely allied species, *Sigmodon hispidus littoralis*. They were

4. 1940, **115**, 863.
5. Theiler, A. *Science*, 1934, **80**, 122.
6. Theiler, *J. exp. Med.* 1937, **65**, 705.
7. Olitsky, P. K. *Ibid*, 1940, **72**, 113.
8. Theiler and Gard, S. *Ibid*, pp. 49 and 79.
9. Armstrong, C. *Publ. Hlth Rep., Wash.* 1939, **54**, 1719 and 2302.
10. Lillie, R. D. and Armstrong, *Ibid*, 1940, **55**, 718.
11. Peers, J. H. *Ibid*, p. 726.
12. Haas, V. H. *Ibid*, p. 1061.
13. Toomey, J. A. and Takacs, W. S. *Proc. Soc. exp. Biol., N.Y.* 1940, **43**, 536.

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unable to infect cotton-rats with nine other strains of human poliomyelitis virus. Jungeblut and Sanders,[14] however, injected cotton-rats with monkey material infected with five different strains of poliomyelitis. Of two cotton-rats injected with the SK Los Angeles strain, one died a week later with no observable lesions, but injection of its brain into another cotton-rat caused flaccid paralysis on the sixth day. The brain of this cotton-rat contained a virus pathogenic for mice. Monkeys immunised with the mouse-passage virus were immune to the SK strain of poliomyelitis virus. As a result of further work Jungeblut and Sanders [15] have found that the mouse-passage virus possesses only limited pathogenicity for the rhesus monkey, since it does not give rise to paralysis. It can, however, be recovered in active form from the central nervous system of the monkey and its presence there seems to interfere with the propagation not only of the SK but also of the Aycock monkey poliomyelitis virus. The interference phenomenon is analogous to that which occurs between yellow fever and Rift Valley fever in the mouse.[16] These results become increasingly significant in view of the fact that one of their strains of mouse "poliomyelitis" virus has been proved by Theiler and Gard [8] to be pathogenic for the cotton-rat; and mice infected with the virus of mouse poliomyelitis become resistant to a subsequent intracerebral inoculation with the Lansing strain of human poliomyelitis virus. It may therefore be said that most human poliomyelitis viruses are pathogenic only for man and monkey; two, the Lansing and SK strains, are in addition pathogenic for cotton-rats and mice. Most mouse poliomyelitis viruses are pathogenic only for mice but one strain is pathogenic also for cotton-rats. Human and mouse viruses give rise to similar lesions; the mouse virus has been found in the intestines of mice and there is increasing evidence that in the same way the human poliomyelitis virus remains for considerable periods in the intestines of man. The crucial question is the exact status of the Lansing and SK strains of poliomyelitis virus. Are they human viruses that have become pathogenic for mice or mouse viruses that have become pathogenic for man?

THE SHIPBUILDERS

IN Tyneside some of the loveliest country in England has been covered with drab and planless streets and fine human material, valued in two wars, has been allowed to suffer and waste in the interval between them. In a new survey [17] Mr. D. M. Goodfellow, Ph.D., shows that though there have been improvements in the past ten years, including recent housing schemes, in 1935–37 Tyneside had an infant-mortality rate 40% higher than that of England and Wales as a whole, and a tuberculosis death-rate more than 50% higher. Tyneside has suffered from three curses. The first has been its dependence on three main industries which have been simultaneously depressed. The second is its geographic isolation; social work there has never had the stimulus of a better record in a neighbouring and competing area, and the rest of the nation has been largely ignorant of conditions in Tyneside. The third is the obsolete and incoördinate distribution of its local-government areas which are comprised in four county boroughs, two municipal boroughs, eight urban districts and parts of two counties. Dr. Goodfellow, who is a native of the area, has been assisted in this survey by members of two Workers' Educational Association tutorial classes. He remarks that "though mankind is our proper study we have as yet studied metals and their stresses with infinitely more devotion." Some might say that our attention to the stresses of metals has brought us to a pretty pass today. Our greatest failure towards the distressed areas has been lack of that constructive enthusiasm which Tynesiders themselves have applied to building the *Mauretania* and the Tyne Bridge, and which the country as a whole has achieved in war production. When we have the will to apply the same drive to poverty, ill health and unemployment we shall be able to make the kind of evils described by Dr. Goodfellow as obsolete as the stunted factory children of a hundred years ago.

14. Jungeblut, C. W. and Sanders, M. *Ibid*, 1940, **44**, 375.
15. *J. exp. Med.* October, 1940, p. 407.
16. Findlay, G. M. and MacCallum, F. O. *J. Path. Bact.* 1937, **44**, 405.
17. Tyneside: The Social Facts. Newcastle-upon-Tyne: Co-operative Printing Society. Pp. 80. 1s.

Sir WILSON JAMESON who succeeds Sir Arthur MacNalty as chief medical officer will relinquish for the purpose his threefold rôle of dean of the London School of Hygiene, professor of public health in London University, and adviser to the Colonial Office. Sir Wilson, who is 55 years of age, is a native of Perth and after graduation at Aberdeen came to London where he combined public health teaching with field work in Hackney, Stoke Newington and Marylebone, finally becoming M.O.H. for Hornsey and Finchley. Meanwhile he was called to the bar. In 1929 he was appointed to the university chair as director of public health at the Keppel Street school, and two years later succeeded Andrew Balfour as dean. His name appeared last year in the list of New Year honours.

It has been found necessary to close the museum of the Royal College of Surgeons in Lincoln's Inn Fields until further notice. As a considerable number of the staff are in the Services, new specimens cannot be mounted and placed in the collection. Those who wish to present specimens to the museum should retain them for the present in their possession, notifying their intention to present them at a later date. The conservator will be glad to give advice about preservation and storage. In the meanwhile, in order to retain their colour specimens should be preserved in Kaiserling I solution. The colour of specimens preserved with formalin alone cannot be restored.

The next session of the General Medical Council will open on Tuesday, Nov. 26, when the president, Mr. H. L. Eason, will take the chair at 10 A.M.

Dr. W. RUSSELL THOMAS has been chosen as Liberal National candidate for Southampton in place of Lord Reith. Dr. Russell Thomas, who is a barrister-at-law at Lincoln's Inn, qualified from Cambridge and Guy's in 1919.

Sir JOHN MAUDE becomes secretary of the Ministry of Health in succession to Sir George Chrystal, retiring on reaching the age limit.

The death in London on Nov. 10 of Mr. C. W. MANSELL MOULLIN, consulting surgeon to the London Hospital, is announced. He was in his ninetieth year.

ALIEN DOCTORS AND NURSES.—Doctors, students and nurses of German, Austrian or Italian nationality may now be employed in E.M.S. hospitals in unprotected areas provided certain safeguards are observed. Permits of employment from the Aliens War Service Department must still be obtained but they will usually be readily granted. Aliens should not be employed in wards set aside for service patients, and wherever possible they should be employed in wards where British doctors and nurses are also working. The number of aliens employed at a hospital should not exceed 10% of the staff (or 20% in hospitals of less than 100 beds). If a serious military situation should arise the authorities may order their immediate removal from the hospitals.

The 1941 edition of the Warner Diary-Calendar of Medical History is now ready and Messrs. W. R. Warner (Power Road, Chiswick, W.4) tell us that a copy will be sent to any doctor who writes for one. This year no diaries can be sent abroad.

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Public Health

The Trend of Measles

In a study of mortality in the first seven months of the war one of the interesting observations made by Stocks [1] was the sudden break in the regular sequence of epidemics of measles. In London, Manchester and Liverpool there is normally a biennial periodicity in the appearance of the disease and an outbreak was to be expected in the December and March quarters of 1939–40. In each city, as fig. 1 shows, it failed to materialise. For instance, in London the deaths in these two quarters were 413 in 1931–32, 513 in 1933–34, 221 in 1935–36, 137 in 1937–38, while in the intervening years they were annually less than 20. In 1939–40 instead of the expected high figure there was only 1 death; while in Manchester there were only 2 deaths compared with 83 in 1937–38 and 188 in 1935–36 and in Liverpool only 1 in comparison with 215 and 213. Stocks suggests that the factors most likely to be responsible were evacuation of the school population and school closure and thinks the latter the more important of the two since, when the epidemic was due to begin, child-density was not greatly below normal. The trend of measles in the three towns, since his study was made, is interesting. In all three the number of deaths has remained remarkably low. In London in the second quarter of this year there were none at all compared with 96 in the same quarter of 1938, 348 in 1936 and 375 in 1934. In the third quarter there were 4 compared with 12, 27 and 18 in the three previous years of prevalence. Notifications in the three cities (see fig. 2) also show that the incidence has remained consistently low though there is a hint of a possible epidemic in the final returns. In Liverpool and Manchester the deaths have also been relatively few in the second and third quarters of this year, but have recently tended to exceed those normally recorded in the epidemic years. The cause is not far to seek. Unlike London they have experienced, as their notifications show, delayed epidemics.

FIG. 1

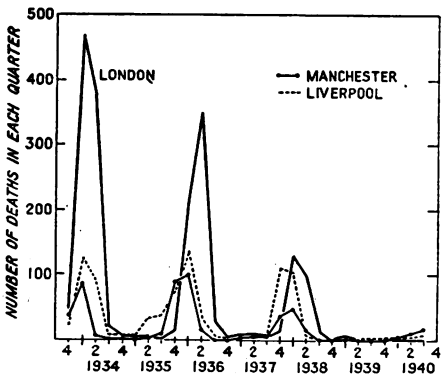
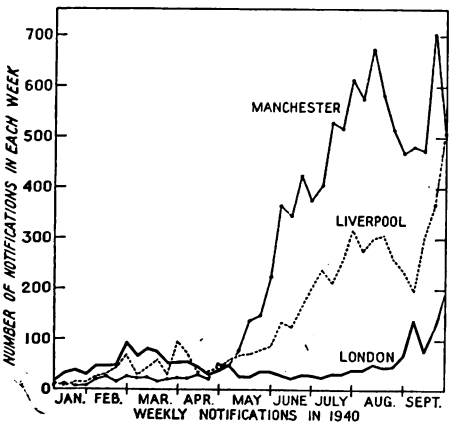


FIG. 2



In Manchester the peak expected at the turn of the year did not materialise until the beginning of August when the incidence is normally at its minimum. The rise set in at about the end of April. In Liverpool much the same trend is apparent, though the epidemic is not yet so clearly on the decline. But the deaths have kept relatively low and the epidemic in Manchester is reported to have been of a milder character than usual.[2] In the summer months secondary infections may be less prevalent and an epidemic at this time of year may be less dangerous. After the present wave the two northern towns may well escape trouble this winter. The trend in London will be watched with interest.

1. Stocks, P. *Lancet*, 1940, 1, 725. 2. *Manchester Guardian*, Oct. 4.

Infectious Disease in England and Wales

DURING THE WEEK ENDED OCT. 12, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2019; whooping-cough, 1373; diphtheria, 1336; enteric fever, 57; measles (excluding rubella), 9905; pneumonia (primary or influenzal), 660; puerperal pyrexia, 145; cerebrospinal fever, 116; poliomyelitis, 30; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 69; ophthalmia neonatorum, 77. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 18 was 1454, including: scarlet fever, 282; diphtheria, 255; measles, 428; whooping-cough, 43; enteritis, 72; chicken-pox, 96; erysipelas, 41; mumps, 7; poliomyelitis, 1; dysentery, 4; cerebrospinal fever, 27; puerperal sepsis, 9; enteric fevers, 16; german measles, 3; other diseases (non-infectious), 78; not yet diagnosed, 92.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 2 (0) from scarlet fever, 11 (1) from whooping-cough, 13 (2) from measles, 34 (0) from diphtheria, 49 (5) from diarrhœa and enteritis under 2 years, and 15 (1) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 8 fatal cases of measles and 5 of diphtheria. Birmingham and Liverpool each had 7 deaths from diarrhœa.

The number of stillbirths notified during the week was 221 (corresponding to a rate of 33 per thousand total births), including 23 in London.

From the Annual Reports

In reviewing the annual reports of the medical officers of health of the metropolitan boroughs we must take account of the strange system of public-health administration in which they work, the artificial nature of the units they control, and the limitation of their powers to fragments of functions.

Chelsea is one of the smallest metropolitan boroughs, with a resident population of 55,400. Its population is selected, consisting of an undue proportion of professional people and their servants. Dr. W. H. Leslie McCarthy gives the birth-rate for 1939 as 9·7 and the death-rate as 14·6. These are crude rates and would indicate that the population is becoming rapidly exterminated if Chelsea were self-contained. The infantile mortality was 33 which is extremely low, especially as 10% of the babies were illegitimate. The number of births accredited to the borough was 539, but only 484 were reported as having been born there, of which only 101 were notified by midwives. The deaths numbered 743, of which 246 were due to heart disease, 93 to other circulating diseases and 103 to cancer. The deaths from acute infections were: diphtheria 3, influenza 20, encephalitis lethargica 1, cerebrospinal fever 2. Tuberculosis caused 51 deaths, over 1 per 1000 of the population appropriate for the calculation of the death-rate (50,890). This is a very high incidence considering the composition of the resident population, but it must be remembered that Chelsea contains a large proportion of serving maids and shop assistants who are specially prone to fatal tuberculosis. The cost of the supply of milk to mothers and children was £945 or £1 16*s.* per child born. Many of the infants would be of wealthy parents, so that the supply of milk to those who need it appears to have been good. Diphtheria was somewhat prevalent in 1939 with 65 notifications, but not severe since it caused but 3 deaths. The immunisation clinic dealt with 241 new cases in 1939. This is less than half of the number of births in the borough, but is not unsatisfactory for London which is far behind in this measure of prevention; it must be remembered, too, that the borough is not responsible for the immunisation of children attending school.

Messrs. Savory and Moore (London, N.15) have reduced the price of their Moryl brand of carbaminoylcholine chloride (carbachol).

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Parliament

EVENTS move swiftly in these days, and public opinion moves with them. The whole-hearted support which the present Government enjoys in all quarters of the House of Commons is as great as ever, and Mr. Churchill's popularity never stood higher. Nevertheless there is an underlying feeling of restlessness which found expression this week in the debate which followed the Prime Minister's review of the war situation. Mr. Churchill had little to say which was not already generally known, in essence at any rate, but he spoke with his accustomed brilliance. Running through his speech there was a note of sober confidence, combined with a strong reminder of the difficult tasks ahead, and the time which may be required for their final accomplishment. He found the course of events at home neither unexpected nor on the whole unsatisfactory. Hitler had been thwarted in his malicious purpose of razing our cities, and while popular activity had not been seriously interfered with by the blitzkrieg little damage had been done to our munitions and aircraft production. None of the services upon which the life of our great cities depends—water, fuel, electricity, gas, sewerage—had broken down. Much damage had been done to property, but the civilian casualties were relatively light—14,000 killed and 20,000 injured—nearly four-fifths of them in London. Even these figures looked large compared with the Service casualties—300 soldiers killed and 500 wounded. Mr. Churchill pointed to the signs of the diminishing scale of the enemy's air attack. In the first week of intense bombardment in September there were 6000 casualties and in the last week of October only 2000. There were other reasons besides weather for this diminution of the violence of the attack; it was believed that other things were going on which would play even a greater part in defeating the enemy tactics as the months passed.

Mr. Churchill did not disguise the seriousness of our recent shipping losses from U-boat action, and he deplored the fact that the use of the southern Irish ports were withheld from the British Navy for the protection of allied vessels in the Atlantic approaches. But it was encouraging to know that we have still nearly as much shipping tonnage as we had at the beginning of the war. Although the sea and the air would be the main elements of our war effort a powerful army would be necessary, which could intervene as the war proceeded to liberate one or other of the countries who were yearning to throw off the Nazi yoke. While not denying the extent of our difficulties in the Middle East as a result of the defection of France, Mr. Churchill assured the House that the balance of forces on the Egyptian frontier and the Sudan was far less unfavourable to us than it was at the time of the French collapse. As to the new theatre of military operations opened up by the Italian attack on Greece, the Prime Minister promised that we would do our best to support our latest ally.

In the debate which followed members allowed themselves a wide latitude in their criticism. Irrespective of party there was a strongly expressed demand for a more vigorous use of our power, particularly against Italy. Many members also pressed for action being taken to secure the use of the southern Irish ports for the British Navy.

* * *

The Duke of Devonshire, Under Secretary for India, has presented a bill in the House of Lords providing for the payment of compensation for disablement benefit in the case of male workers who died from or became totally disabled or permanently incapacitated as a result of the respiratory disease of byssinosis.

The Prolongation of Parliament Bill, which has already passed the House of Commons, has received a second reading in the House of Lords.

Means Test

Mr. WINSTON CHURCHILL, Prime Minister, made the following statement: The Government intend to introduce legislation to enable them to give effect to certain changes designed to remove causes of complaint against the existing means test. The test will become one of personal need, and will be based on the following principles. The needs and resources of the applicant will continue to be aggregated with those of his wife and of any dependants, but the resources of any other member of the household will no longer be aggregated with those of the applicant. If the applicant is the householder, a standard contribution by non-dependent members of his household towards rent and other overheads will be assumed and taken into account as part of the applicant's resources. This means that inquiry will normally be limited to the needs and resources of the applicant, his wife and dependants. If the applicant is not a householder, and is living with relations, regard will be had to the constitution and circumstances of the home in assessing his personal needs, but inquiry into the resources of other members of the household will in any case be greatly reduced and will often be unnecessary. No applicant without resources of his own will be left dependent on other members of the household for means to buy clothing and other necessary personal requirements. The Government have asked the Assistance Board to work out the detailed application of these principles in the case both of unemployment assistance and of supplementary pensions in order that they may be in a position to submit draft regulations as soon as the necessary legislation has been passed.

QUESTION TIME

Horder Committee's Report

In answer to a question Miss E. WILKINSON, under-secretary to the Ministry of Home Security, said: Lord Horder's committee was appointed by the then Minister of Home Security and the Minister of Health, on Sept. 14, 1940, and presented an interim report within a few days. Since then the committee has continued to sit and the Ministers have now received a further report bringing the account of their investigations and findings up to date. The recommendations of their interim report were accepted, and action is being taken upon them. This also applies to some of the recommendations in the further report; the others are now under consideration. Now that both reports are completed, the Home Secretary proposes, with the agreement of the Minister of Health, to publish the recommendations of the committee.

Home Guard Casualties

Mr. J. E. GROVES asked the Secretary of State for War whether he was aware that certain local medical war committees had informed general medical practitioners that they were required to provide the essential first-aid treatment of battle casualties and injuries sustained by members of the Home Guard while on duty without fee; when and by whom was the suggestion initiated; did the proposal involve the free supply of drugs, dressing and appliances, the doctor proceeding at his own expense to the casualty, with his instruments and equipment, or would the casualty be brought to the doctor; the free treatment of casualties who were other doctors' patients; and free treatment for casualties resulting from an attempted invasion by the enemy.—Sir E. GRIGG replied: A letter was received from the Central Medical War Committee last July offering the services of the medical profession throughout the country, free of charge, for attendance on members of the Home Guard who sustain casualties while on duty, the arrangements being made through the Central Committee and its local committees. This offer was gratefully accepted by the War Office, and the Central Committee was invited to place its local organisations in touch with each of the Territorial Army county associations. The offer is understood to include the free supply of such drugs and dressings as the doctor may have available for the first-aid treatment of the patient, and the circumstances in which the doctor would be called upon to render assistance would be similar to those in which emergency medical treatment is obtained from a doctor in the case of ordinary accidents.

N.H.I. and Prisoners of War

Mr. F. J. BELLENGER asked the Minister of Health what was the position with regard to contributors under National Health Insurance Acts who were prisoners of war; and

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would he say whether such members of approved societies were fully protected as to benefits during the period they remained prisoners of war.—Mr. M. MACDONALD replied: If an insured person is taken prisoner of war whilst serving in the forces his rights to health-insurance benefits are not affected in any way by the period of his imprisonment. If a person not serving in the forces is taken prisoner whilst insurably employed he will normally under the existing law remain insured for a period on average of 21 months from the date of cessation of his employment. Accordingly it has not so far been necessary to make any special provision for safeguarding the rights of persons within this category.

Physical Fitness of Service Recruits

Mr. RHYS DAVIES asked the Minister of Labour whether the standard of physical fitness of men entering His Majesty's forces during the present conflict was as good or better than between 1914–18; and whether any improved standard was due to the extension of the social services.

Mr. ERNEST BEVIN: Figures for the whole period 1914–18 are not available; but a comparison of the results of the medical examination of men under the Military Training and National Service (Armed Forces) Acts with those of the examination of 2,500,000 men for entry into the Armed Forces during 1917–18 suggests that there has been a very definite advance in the standard of physical fitness in the intervening period. I have no doubt that the extension of the social services has been an important factor in this imprisonment.

Prevention of Tetanus in the Army

Dr. A. V. HILL, F.R.S., asked the Secretary of State for War if he could now give the results of the new inoculation introduced into the Army for the prevention of tetanus, and the use of the T.A.B. vaccine in protecting the soldier from typhoid-paratyphoid infection; what proportion of the Army had accepted inoculation; whether the British Army was the only one in which immunisation against typhoid was not universal; and how much, on the basis of recent experience, the chance of a soldier's contracting typhoid or paratyphoid was increased by refusing protection.—Mr. R. K. LAW, financial secretary to the War Office, replied: In no case has tetanus been reported in wounded soldiers who had received protective inoculation. All the cases reported have occurred in non-immunised men. With regard to the T.A.B. inoculation, the reported incidence of proved infections of typhoid and paratyphoid fevers in the whole of the British Expeditionary Force and the Home Forces, from the outbreak of war to the present time, has been 32 cases, 26 of which have never received T.A.B. vaccine. About 80% of the Army accepted inoculation. In no other army is typhoid immunisation not universal. On the basis of the figures I have given, the chance of contracting typhoid or paratyphoid fever is increased roughly 17 times by refusing inoculation.

Preventive Measures for Civilians

Dr. A. V. HILL asked the Minister of Health whether, in view of possible epidemics of typhoid and paratyphoid, means and material were available for widespread inoculation in regions likely to be affected: and, in view of the fact that the commonest source of such infection was from workers employed in connexion with food- and water-supplies, he would make provision for all such workers to be protected without delay.—Mr. M. MACDONALD replied: Means and material are available for extensive inoculation of the population of particular localities if they should be placed at special risk. I have looked into the particular suggestion in the second part of the question and I am advised that the action suggested would not have the effect of protecting the consumer against infection. I have just sent a circular to local authorities drawing their attention to certain other measures which would reduce risks of infection.

Dr. HILL asked the Home Secretary whether, in view of the successful results of the new inoculation of the Army against tetanus, it would now be possible to offer the same protection to the police, the fire services, and air-raid precaution workers in general.—Mr. H. MORRISON replied: This matter was carefully considered by my department and the Ministry of Health some time ago and the conclusion was reached that, for a variety of reasons, special measures of advance immunisation against tetanus should not be extended to the services mentioned. I am advised that the normal method of inoculation after a person becomes a casualty affords an adequate safeguard against any risk of tetanus.

Mr. R. W. SORENSEN asked the Minister of Health whether he would recommend to, or instruct, local authorities in control of public shelters used for sleep at night to make available in all such shelters supplies of antiseptic and medicinal tablets or pastilles for free distribution with a view to minimising ailments and infection.—Mr. MACDONALD replied: The medical aid posts at the larger shelters will be equipped with appliances and drugs based on a schedule recommended by the committee over which Lord Horder presides. This schedule includes some medicinal tablets.

Health Commissioner for London

Mr. K. LINDSAY asked the Home Secretary whether, in view of the importance of speedy executive action, he would now appoint a health commissioner for the London region with full powers.—Mr. MORRISON replied: I have been in consultation with the Minister of Health on this suggestion and we are satisfied that the problem can best be handled by the existing organisation both central and local, and that the appointment of a health commissioner is not necessary.

Night Employment

In reply to Mr. DAVID ADAMS Mr. ERNEST BEVIN, Minister of Labour, said special inquiries had already been instituted as to whether the more extensive night employment of youths between 16 and 18 under war conditions was producing ill health or undue fatigue. The matter would continue to be closely watched and if ill effects were found to be resulting appropriate action would be taken.

Psychiatrists and Service Patients in Mental Hospitals

Mr. RHYS DAVIES asked the Minister of Health whether he was aware that psychiatrists employed as civilians in mental hospitals were not allowed to treat patients in the same hospitals who were members of His Majesty's forces, and that neurosis cases arising in the forces were therefore, sometimes, neglected; and would he arrange with the service departments to remove this anomaly.—Mr. MACDONALD replied: I have no knowledge of the difficulties to which the hon. member refers, which seem to be contrary to my own information. If he will furnish me with instances I will go further into the matter.

Surgeon Detained

Sir ERNEST GRAHAM-LITTLE asked the Home Secretary whether he would consider the release, under such conditions as he might wish to impose, from detention in Brixton prison, of the surgeon to whom his attention was drawn on Oct. 17, in view of the representations made by some eminent members of the medical profession who had intimate knowledge of his activities, and in view of the inconvenience suffered by three important London voluntary hospitals, of the honorary staff of which this surgeon was an active member.—Mr. MORRISON replied: This case is to be reviewed by the advisory committee who will take account, amongst other things, of any representations made on behalf of the appellant.

SHOCK CAGES—The most junior nurse knows that the shocked patient must be warmed up; and she has been religiously warned against burning him with hot bottles. The Medical Supply Association has provided a convenient device, the Restor shock cage, which will bring him to the appropriate temperature and keep him there. It is made of wire in the shape of an ordinary bed-cradle, and is fitted on the inner side of the arch with two electric bulbs of the carbon-filament type. These are separated from the patient by a small wire cage of their own. The lamps can be connected with a wall plug by 9 feet of flex; when out of use the flex can be coiled neatly at the side of the cage over double hooks, and cages can be stored one above the other in nests. There is a safety fuse in the heat-units circuit which gives protection in case of an electrical fault; the heat units have been chosen to avoid overheating, but to prevent chance accidents the association has provided a second, slightly more expensive, model in which a thermostat is incorporated. Models of a third type can be plugged in series, the flex of one cage being connected to a plug on the cage alongside. In this way a single wall plug can be used for several cages up to the limit of its capacity. The current consumption of a single cage is only 10 watts, so that a 5 amp. socket is adequate for 10 cages and a 15 amp. socket for 30 cages.

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Letters to the Editor

COMPULSORY IMMUNISATION

SIR,—As the people of this country have willingly submitted to compulsory military service, compulsory rationing, compulsory billeting, &c., I think they would also be amenable to compulsory active immunisation against disease when particular danger exists, as at the present time. As accommodation for infectious disease is limited and may become more so, I think it is essential that existing beds should be used to the best advantage. It would appear most undesirable, to put it mildly, to use a proportion of these beds for diseases which by their very nature must be treated under medical and nursing supervision in hospital, but which can so easily and effectively be prevented by measures of active immunisation at our disposal. Facilities for the prevention of certain diseases such as diphtheria and smallpox on a voluntary basis have existed for some time, but the results to date have not been completely satisfactory and have been directly proportionate to the particular initiative and energy of the medical personnel of each public health authority.

I would suggest, therefore, that the following extra *compulsory* safeguards to public health be promoted:—

(1) Immunisation against diphtheria of all healthy school children. Whooping-cough vaccine could with advantage be given at the same time to all those who have not yet suffered from this disease.

(2) Vaccination against smallpox.

(3) Immunisation against the typhoid group of fevers for the population of heavily bombed areas. Where the sewerage system is persistently damaged there is a real danger of pollution of water-supplies and even where the water of peripheral mains contains a proportion of chlorine this is not sufficient to safeguard the health of the community. The danger from the sewers lies not only in the pipes which are fractured by the direct impact of the bombs, but also from the possibility of smaller defects which may go undetected at a considerable distance away. Many of the public, on their own initiative, have taken to boiling their water, but facilities for T.A.B. inoculations have so far only been sponsored by very few authorities.

(4) Immunisation against tetanus, for members of defence forces and civilians exposed to the risk of recurrent injury.

While the necessary legislation is being enacted I would suggest that widespread publication in the lay press be started to warn the general public of the real dangers to health consequent to aerial attack in war, to state how difficult it will be to afford the peace-time facilities for treatment of infectious disease, to advise them of the ease with which certain infectious diseases can be prevented, to emphasise the lack of danger to life or of serious inconvenience from the injection materials now used, and to promise that in the near future widespread facilities to suit the convenience of all sections of the community will be forthcoming. The present full-time medical and nursing staffs of public-health authorities and the Emergency Medical Service could be easily supplemented by the enlistment of local general practitioners in each area.

The cost of a widespread scheme of active immunisation such as the one visualised would be comparatively small, particularly so if all those people who can afford to pay were asked to do so.

Edgware, Middlesex. A. A. CUNNINGHAM.

TREATMENT OF TONSILLITIS WITH BISMUTH

SIR,—The treatment of tonsillitis with bismuth intramuscularly has been used for some time in this hospital but the method appears to be little known. It was first introduced by Monteiro in 1933 using a liposoluble preparation, and later was followed by De Mello. Stiehr and Gipperich have also published results with this drug but no reference has been found to it in this country. During the recent epidemic of sore throat opportunity has been taken of again trying out this form of treatment but with a new bismuth preparation.

Twelve cases were admitted to hospital and eleven others were treated as outpatients. Of the twelve admissions four were cases of Vincent's angina, the remainder were cases of follicular and simple tonsillitis with a mixed flora present; among the eleven outpatients there were no cases of Vincent's infection. The symptoms were those commonly associated with the condition. The treatment in each case consisted of a single intramuscular injection of 2 c.cm, of a solution containing 0·12 g. of sodium iodobismuthite and 0·24 g. of sodium iodide (put up in ampoules for me by Messrs. Allen and Hanburys). The injection is painless, is always well supported and is followed by no ill effects. Among the twelve cases under care in hospital the temperature fell to normal within 24 hours in ten cases; in the other two cases in 28 and 36 hours. All those treated as outpatients were seen the day after the injection and all had lost their fever. Pain on swallowing, often a very distressing symptom, was relieved in the cases of Vincent's infection in from 16 to 24 hours, in the other cases in from 7 to 10 hours. Redness and swelling of the fauces subsided, with clearing of the exudate, within 12 hours, gland swelling subsided 18 hours later with rapid improvement in the general condition. In no case was there albuminuria. No local or other treatment was given in these cases.

The particular formula has been adopted because the addition of sodium iodide renders the preparation more stable and prevents hydrolysis. The bismuth is negatively charged, which ensures rapid absorption and penetration of the tissues, especially lymphatic tissues such as the tonsils, while toxic effects are obviated by rapid elimination.

This method of treatment by a single intramuscular injection should prove of considerable value in dealing with epidemic "shelter sore throat."

French Hospital, London. S. GALEWSKI.

ESTIMATION OF BLOOD-VOLUME IN PLASMA TRANSFUSION

SIR,—In their paper of Nov. 2 Bushby, Kekwick and Whitby state that the blood-volume can be estimated by observing the falls in hæmatocrit, hæmoglobin or cell-count which follow plasma transfusions—a method used by Robertson and Bock during the last war (*Spec. Rep. Ser. med. Res. Coun., Lond.* 1919, No. 25, p. 226). The problem of transfusion after hæmorrhage is not, however, as it might have been, a simple mechanical one of emptying and filling. It is a much more complicated affair because hæmorrhage is noxious to the body and calls forth responses to an abnormal state. In advocating plasma transfusions in the treatment of hæmorrhage (*Brit. med. J.* June 29, 1940, p. 1047) I reported a series of cases in which plasma transfusion was accompanied by a rise in cell-count. I considered this rise to be due to numbers of red cells which had become sidetracked in muscle capillaries being swept back into the circulation by the raised blood-volume and blood-pressure caused by the transfusion. Whether or not this explanation is correct it is difficult to reconcile these clinical observations with the statements of your contributors.

Manchester. H. J. BRENNAN.

ASTHMA THROUGH THE BRONCHOSCOPE

SIR,—We are much interested in Major d'Abreu's description in your issue of Oct. 5 of an asthmatic attack seen through the bronchoscope. We follow the simple routine of giving the patient a Decicain tablet to suck 10 or 15 minutes before anæsthetisation of the throat by spray and brush. When the tablet is dissolved the throat is sprayed and the palate, fauces, tongue, teeth and lips are all painted with cocaine-adrenaline solution; the pyriform fossæ are also painted. It is now easy to visualise the cords with a laryngeal mirror, and to inject cocaine-adrenaline solution over them down the trachea.

Following the recommendation of Chevalier Jackson we have bronchoscoped nearly 100 patients suffering from chronic bronchitis and emphysema with asthmatic spasm, and have observed the tenacious mucous plugs to which d'Abreu refers. The appearance of the bronchial mucosa depends much upon the efficiency with which the anæsthetic solution has reached it. In our experience the outstanding feature in the quiescent stage is prominence of the longitudinal striæ in the floor of the trachea

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and the bronchi; during the spasm, on expiration and particularly on coughing, it is a forward protrusion of the muscular posterior wall and mucosa so extreme as to leave no more than a "new moon" slit, even in the trachea. We agree that the carina appears shorter and wider, but this is probably due to turgidity and congestion rather than to actual shortening.

About a dozen of these patients have returned each winter for a repetition of treatment which did them good. In true asthma we are not prepared to say how much of the benefit is due to psychological effect.

E. H. HUDSON,
London Chest Hospital, E.2. H. M. MORLOCK.

INFANTS IN DAY NURSERIES

SIR,—I wish to endorse Professor Parsons's views in his letter of Oct. 12. It seems to me that Dr. Barrow and Dr. Brenner avoid the main issue in their criticism of his letter. There can surely be no doubt that if infants during the breast-feeding period are admitted to day nurseries breast-feeding will be discouraged, artificial feeding will be encouraged, and infection will spread amongst these babies of the same age-period if congregated together. If the Ministry of Health realise these dangers it is inconceivable that they have not given directions to the local authorities to prevent the admittance of these babies to day nurseries. Professor Parsons makes an excellent suggestion when he says, "It would, however, be interesting to know whether the dearth of skilled munition workers in any area is so great as to make the employment of mothers of infants under nine months of age essential, since this group can only represent a relatively small fraction of the total number of female workers." With regard to the question of anxiety in the mother interfering with the supply of breast milk referred to by Dr. Brenner, I have seen a large number of these cases after air-raids and in my experience after two days the supply returns again and the infant continues to be breast fed with no symptoms suggesting any alteration in the quality of the milk.

Kensington, W.8. RONALD CARTER.

AIR PURIFICATION BY HYPOCHLORITES

SIR,—A sentence in your leading article of Oct. 12 (p. 456) refers to the use of sodium hypochlorite for aerial disinfection in these terms: "The last of these is the cheapest, but it is unstable and highly corrosive to metal containers and has other disadvantages." And the authority cited for this statement is a report by Baker, Finn and Twort in the September issue of the *Journal of Hygiene* whose conclusion reads as follows: "That there are definite possibilities for the use of hypochlorite mists for combating aereal infections, but that the odour, irritant effects, opacity of the mists and corrosion of metals &c. will limit the sphere of utility." These opinions are based on work done with nebulisers using enormously stronger concentrations of germicide than those required in a properly designed atomiser. On their own statement they require a concentration of (weight to volume of air) 1 part in 1 million. The standard Milton Dynalysor requires a concentration of only 1 in 40–50 millions, and this concentration of 1% sodium hypochlorite contains no more than 1 in 5000 millions of the active germicide. Dr. Pulvertaft tested concentrations of 1 in 40, 20, and 10 millions and remarks: "These produced no visible mist and in each case a slight odour only, completely non-irritant, and, as a personal opinion, rather pleasant. In my opinion there is no possible menace to the health or convenience of anyone submitted to the mist in efficient concentration." During 1930–35 this system of air purification was tried in large-scale experiments on inhabited and furnished rooms without experiencing any of the objections raised by the authors.

As regards "irritation," a concentration of about 1 in 200 has long been employed by the general public for spraying the nose and respiratory passages. "Opacity of the mist" is caused by particles of evaporated salt which eventually fall to the floor. The authors employed a hypochlorite with a salt content more than 3 times that of the standard spray. "Corrosion of metals" is caused by the deposit of damp salt, as in the rusting of iron. With a dose of 1 in 40 millions for a room of 2000 cu. ft., 10 feet high, there would eventually be deposited 0·002 mg. of salt on each sq. in. of floor space. This is probably considerably less than could be found at any time in any ordinary dining-room carpet! The authors raise another "contingency for serious consideration" in "the bleaching and rotting effects of free chlorine." They seem to be unaware that hypochlorites contain no free chlorine and that this gas is not given off by hypochlorites unless decomposed by strong acids. Hypochlorite air-disinfection is based upon the liberation of hypochlorous acid which is essentially different in its characters from chlorine. It has little odour, no irritant properties, and its germicidal potency is immensely greater than that of chlorine. It is common knowledge that hypochlorite solutions can be rendered for all practical purposes completely stable.

My own opinion is that hypochlorites do not behave as aerosols when sprayed into the air; in other words, they do not kill by the action of small liquid drops, but by the setting free of hypochlorous acid gas which is absorbed by the moist bacteria. I am aware that this is controversial, but I have seen no evidence of any value for the aerosol theory so far as hypochlorites are concerned, and there is a great deal against it.

London, W.1. A. T. MASTERMAN.

SUBACUTE BACTERIAL ENDOCARDITIS

SIR,—Dr. Fletcher's account in your issue of Oct. 26 of a case of subacute bacterial endocarditis treated with sulphapyridine and heparin prompts me to draw attention to our experience of the method in this hospital. Four cases had been treated and two more were under treatment when the hospital was bombed. Of the four treated, one has remained well for six months, two died of intracranial hæmorrhage, and one of toxic jaundice. Positive blood-cultures were obtained before treatment in every case and in certain cases the organism's growth was tested against the drug in vitro. We experienced the same difficulties as Dr. Fletcher in the standardisation of heparin and can endorse his statements about the danger of intracranial hæmorrhage.

Guildford. C. P. PETCH,
Medical Registrar, St. Thomas's Hospital.

BLOOD SEDIMENTATION INDEX

SIR,—The experience narrated by Dr. Phillpotts is by no means uncommon. A blood sample set up in a sedimentation-tube after an hour or two's delay will sometimes reproduce exactly the behaviour of a sample of the same blood set up immediately after withdrawal from the vein—but not always. Here is a case in point where it did not:—

	1st hour reading.	Maximum velocity per 100 minutes.
No delay	26 mm.	68 mm.
Two hours' delay	35·5 mm.	68 mm.
Four hours' delay	36 mm.	68 mm.

As he suggests, this may be due to cooling effects which obtained during the first sedimentation, and which were practically complete before the second and third (for the experiment was performed at a room temperature of 18° C.); or it may be due to agglutination taking place during the two hours' delay, so that the clumps of corpuscles, being fully formed from the start in the 2nd and 3rd sedimentations, achieve their maximum velocity earlier. Or, of course, it may be due to both factors. As I always found that slowly sedimenting bloods are less affected in their first-hour readings by delay than are the rapid ones—the sort that show 100 mm. and more in an hour—I have always assumed (perhaps wrongly) the second hypothesis to be true.

Dr. Phillpotts's summing up ("that one may safely keep a sample of blood up to 24 hours before measuring its sedimentation-rate and still have reasonable certainty of obtaining the correct result") is only saved from being really naughty by the conditional clause—"The temperature at which the rate is measured must *obviously* [my italics] be constant, however." I confess I have no experience of blood sedimentation experiments performed in a constant-temperature observation chamber.

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I haven't got one; and there are comparatively few clinicians who have. The sedimentin index was devised to supply clinicians with a numerical assessment of disease processes, determinable by a non-laboratory process. Whatever temperature variation (within every-day limits) and delay (to an hour or two) may do to the first-hour reading, the maximum velocity, and hence the S.I., remains unaffected. That's my story, and I'm sticking to it.

Hartford, Cheshire. GEORGE DAY.

SPREAD OF PARADOXICAL METASTASES

SIR,—Your annotation on this subject clears up a case which has been puzzling me for some years. A lady of about 50 was admitted to hospital with pleural pain and dyspnœa of some standing, and on radiography she was found to have a large encysted empyema in the right pleural cavity. Operation was advised, and the patient readily agreed to this, though she stated quite calmly that she knew she would die. The empyema was opened and a large amount of cheesy material was scooped out; the wall of the cavity was firm and fibrous. She stood the operation well, but six hours later she collapsed suddenly and died. At autopsy numerous air-bubbles were found in the big meningeal venous sinuses. There were no air emboli elsewhere in the body, and apart from fibrous changes the lungs were normal. Surgeons, pathologists and physicians were alike unable to explain how air could have passed from the operation site through the arterial and capillary system to the venous sinuses. The experiments described in Dr. Batson's paper solve the mystery. Probably the fibrous capsule of the empyema prevented the pleural veins from collapsing. Air was sucked into these, passed into the azygos vein, thence to the rich anastomosis in the vertebral bodies, and finally up to the meningeal sinuses. Had we examined the vertebral bodies our difficulties might have been solved.

London. STEPHEN TAYLOR.

ADHERENT PERICARDIUM

SIR,—May I join forces with Dr. Poynton in disagreeing with Dr. Armstrong's statement that the constrictive type of adherent pericardium is never rheumatic. Neither can I agree that it is the "widely held clinical view that cardiac compression never follows a rheumatic pericarditis." Today more than ever the differentiation of rheumatic constrictive pericarditis from non-rheumatic constrictive pericarditis (so-called Pick's disease) is not merely of academic interest; the advisability of Delorme's pericardial resection depends on an appreciation of the fact that a heart with valves already ravaged by rheumatism will not be expected to respond in the truly astounding manner of a heart with normal valves and myocardium.

As long ago as 1882 Rosenbach, closely followed by Osler, described the characteristic features of rheumatic constrictive pericarditis, and several years ago Vaizey suggested [1] the term "Rosenbach-Osler syndrome" for these patients. Briefly, they differ clinically from the non-rheumatic patients in that valvular murmurs are present, the heart is enlarged, and the prognosis so much the poorer. Auricular fibrillation occurs in both types of lesion but is far commoner in the rheumatic case. Of the known causes of non-rheumatic constrictive pericarditis the commonest is tuberculosis, but it is still true that the causation of the majority of cases is unknown.

May I also suggest that the term "Pick's disease" be abandoned. Our own Chevers (of Guy's Hospital) described [2] two cases of this non-rheumatic constrictive pericarditis over half a century before Pick's paper appeared [3] in Germany.

Horton Emergency Hospital. S. ORAM.

WE regret that the signatures of our correspondents, Mr. Michael J. Smyth and Dr. S. C. Lewsen, were misspelled in our last issue.

1. Vaizey, J. M. Thesis for M.D. Cambridge.
2. Chevers, N. *Guy's Hosp. Rep.* 1842, **7**, 387.
3. Pick, F. *Z. klin. Med.* 1896, **29**, 385.

BILATERAL EXOPHTHALMIC OPHTHALMOPLEGIA

SIR,—Dr. H. G. McGregor in his article on exophthalmic ophthamoplegia in your last issue mentions the possibility that the second eye may become affected some time after the other. I have just seen my first example of this rare but important development in a series of between 30 and 40 cases. In 1935 a man, then aged 43, developed exophthalmic ophthalmoplegia in the right eye. As he also showed symptoms of thyrotoxicosis partial thyroidectomy was performed; the operation cured these symptoms but left his eye unchanged. Five years later exophthalmos and ophthalmoplegia have appeared in the left eye, which is now worse than the right one. The thyrotoxic symptoms, however, have not recurred.

Harley Street, W.1. W. RUSSELL BRAIN.

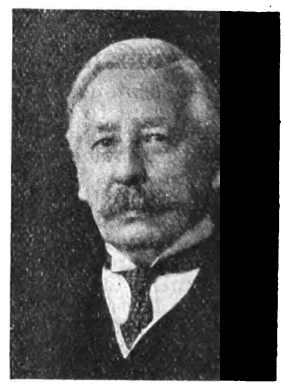
*** The correct reference to Dr. Russell Brain's paper quoted by Dr. MacGregor is *Quart. J. Med.* 1938, **31**, 293. —ED. L.

Obituary

WALTER GEORGE SPENCER

O.B.E., M.S. Lond., F.R.C.S.

Mr. W. G. Spencer, vice-president and historian of the Westminster Hospital, who died on Oct. 29 at the age of 83, came of Wiltshire yeoman stock of which his speech berayed him. Son of Walter Spencer of Little Chalfield he was educated at Weymouth College and entered St. Bartholomew's Hospital where he held several scholarships and in 1886 graduated M.B. with third place on the honours list. He became house-surgeon to H. T. Butlin with whose book, "Diseases of the Tongue," his name was later to be associated. After postgraduate work at Berlin and Halle he returned to London to work at the Brown Institute under Victor Horsley on problems of respiration and circulation. He obtained his higher surgical qualifications in 1887 and two years later he was awarded the Jacksonian prize for an essay on intracranial abscess and tumours. Meanwhile a vacancy at the Westminster Hospital gave him an early start on his life's work. Of his work there S. C. writes: "Spencer's surgical courage was exemplified in his undertaking operations of the greatest magnitude. Even 25 years ago intracranial tumours, gastrectomies and hind-quarter amputations were not infrequently seen in his wards. He cared little for the refinements of technique, he operated garbed in a mackintosh apron rubbed down with 1 in 20 carbolic, he scrubbed his hands thoroughly and never wore gloves except for his own protection in septic cases. He was a swift operator and never wasted time: speed combined with clinical acumen and an accurate knowledge of anatomy made him a surgeon of great ability—daring and yet safe." In the medical school he lectured on physiology and later on clinical surgery, and although he lacked clarity of exposition he always had a great following as a teacher, for his knowledge was encyclopædic and his approach to a case direct. At the bedside he built up for the student a complete clinico-anatomical picture. He examined for the College of Surgeons and the Universities of London and Manchester. In the board room his fearlessness often led him to be in an undismayed minority of one, but his ability as an administrator was recognised when he became chairman of the hospital house committee. Westminster Hospital was his chief concern but not his only interest. In 1915 he was elected to the council of the Royal College of



Surgeons and twice he served as vice-president. In 1896 and 1897 he was Erasmus Wilson lecturer, in 1920 he gave three Hunterian lectures, in 1922 the Vicary lecture and in 1923 the Bradshaw lecture. In 1929 he was elected to the senate of the University of London where he was a firm supporter of the external side of the university and a champion of equal opportunity in medical teaching for women.

His thirst for knowledge was never satisfied. New methods of treatment always appealed to him and on his retirement from the active staff of the Westminster in 1923 he followed the development of radium therapy and when at the end of six years he was impressed by its value he brought out a third edition of "Diseases of the Tongue" incorporating more modern methods. Again, late in life he took up chess and became a proficient player and in the last decade of his life he mastered enough Latin to enable him to carry out his admirable translation of Celsus for the Loeb library, the only version by a modern surgeon for the use of surgeons. At the London Library under Sir Hagberg Wright and at the College of Surgeons he helped to prepare the vast mass of material which afterwards appeared as Plarr's Lives of the Fellows. He was also active as an honorary librarian of the Royal Society of Medicine. His history of the Westminster Hospital which appeared in 1934 remains as a monument of his industry. The picture of a many-sided personality is completed by the words of another friend: "Spencer was a great walker and talker, in which capacities I knew him best. For many years we were companions on Sunday walks covering 15 or 20 miles, where his knowledge of footpaths and byways made them a delight. In his professional relations he was a generous friend to younger men."

Mr. Spencer married Elizabeth Chorlton, a sister at St. Bartholomew's Hospital. His only son survives him, his daughter died soon after qualification.

LEONARD BUCKLEY

M.B. LPOOL; MAJOR, R.A.M.C.

LAST month Major Leonard Buckley was killed by enemy action while in command of a military hospital near London. He was born at Crosby in 1886, the youngest son of William Buckley, J.P., of Blundellsands. He studied medicine at Liverpool University where he qualified in 1910, and after holding resident posts at Liverpool Royal Infirmary he joined the R.A.M.C. in 1911. During the last war he served in France and was promoted captain in 1915. In 1921 he retired from the army and joined a partnership at Wincanton, Somerset. He was on the reserve of officers and when war broke out he was called up and appointed acting major. Last September he was awarded a brevet majority.

He married a granddaughter of Jacques Offenbach, who died on Nov. 7. Three sons survive them. One of his partners writes: Dr. Buckley was always a cheerful and willing worker, ready to help us in any difficulty at any time of the day or night. He was very popular with his patients, especially among the poor. The death of his only daughter while still a child, after a long and trying illness, was followed by a severe operation on himself which undermined his usual robust health, but he carried on his practice with his old energy and success. He was a good lawn-tennis player and for many years was captain of the East Somerset golf club.

WILLIAM ROBINSON

M.D., HON. D.CH. DURH., F.R.C.S.

Dr. William Robinson died on Oct. 9 at the age of 81 at Stanhope, his birthplace. He spent his schooldays there and at Newcastle, and after qualifying from the old College of Medicine he returned in 1881 to Stanhope and joined Dr. Charles Arnison in his country practice. Robinson knew the countryside and the hard life the dalesfolk led. On his long rides he had time for thought and his thoughts were practical and compassionate. Goitre was endemic in the outlying parts of the dale, and this was the subject on which he wrote his thesis in 1884. Lead-mining was the principle industry and two-thirds of the miners had tuberculosis. Dr. Robinson founded the society for the prevention and cure of consumption in co. Durham. He became an advocate of sanatorium treatment and with the help of his new society sanatoriums were opened at Stanhope and Wolsingham. In 1893 he addressed the public-health section of the B.M.A. on lead-miners and their diseases. He persuaded the friendly societies to set up a convalescent home at Grange-over-Sands. Yet in the midst of these wise activities he found time to take the F.R.C.S., no mean feat for a general practitioner in an isolated northern country town, and two years later in 1894 he joined Mr. Edwin Maling in practice at Sunderland. Mr. Maling was associated with the Eye Infirmary there which his father had founded and soon Dr. Robinson also joined the staff. His interest in industrial diseases continued and in 1907 he contributed the first paper on bottle finishers' cataract to the *British Medical Journal*. He was also appointed to the honorary staff of the Sunderland General Infirmary where, though he was nominally physician, he did most of the operating, and during the last war he was in charge of the surgical department of the Sunderland War Hospital with the rank of major. His interest in social conditions ensured him a place on the magistrates' bench and for some time he was chairman of the juvenile court of the district. He was awarded the honorary degree of D.Ch. at the centenary celebrations of the College of Medicine of Durham University. His three sons became doctors and for many years Dr. Robinson was in partnership with his son Dr. Geoffrey Robinson. As he grew older he undertook less medical work and some of his leisure was spent in writing his reminiscences, "Sidelights on the Life of a Wearside Surgeon," which appeared last year and which was a record of quiet and solid endeavour enlivened with anecdotes about the infinite variety of his colleagues and patients.

FACTORY WELFARE WORK

Mr. ERNEST BEVIN told a meeting of members of the House of Commons, over which Sir Francis Fremantle presided, of his plans for the welfare of our workers. With the colossal development of war industries it was no longer possible to rely on voluntary efforts for the organisation of welfare work in our factories and a welfare order applying to works or groups of works employing upwards of 250 persons had been issued. An adequate supply of trained welfare officers had already been assured by payment of fees for the attendance of selected candidates at courses arranged by the universities, and special courses had been arranged for industrial nurses. He believed that these officers, picked for their personality and experience, would be regarded as ranking equally in importance with the members of the factory staff responsible for production. Hitherto A.R.P. services and the Home Guard had been provided for the protection of the workers, but too often nothing had been done to promote their morale, comfort and welfare. These would now become the responsibility of the welfare officers.

The appointment of doctors experienced in problems of fatigue and psychology was another feature of his scheme, and a special course of instruction in industrial hygiene would be provided at the London School of Hygiene. The factory doctor was now recognised as essential to works management, to supervise the health of the workers, to ensure prompt treatment of injuries, and to coöperate with the general practitioner and the hospital to secure early restoration of the patient to industrial efficiency. Mr. Bevin hopes to keep factory welfare work distinct from local welfare activities. When a man has finished his day's work he likes to be independent and free of the discipline necessarily connected with his employment. Other welfare officers will therefore be appointed to encourage local organisations who provide means of recreation, relaxation and amusement outside the factories. They will also assist in arranging for the suitable billeting of imported workers, and for transport facilities to reduce fatigue and discomfort of those whose homes were distant from the factory.

Mr. Bevin gave an encouraging account of the measures to be taken for safeguarding the health of the workers during the coming winter, and of the experience gained in reducing industrial fatigue by the rational limitation of working hours which had been found to ensure the maximum output.

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Medical News

University of Oxford

Sir Arthur Hurst has been appointed lecturer in clinical medicine for two years, Prof. G. E. Glask lecturer in clinical surgery for two years, and Dr. C. L. Cope as Nuffield lecturer in clinical medicine for five years while holding the office of first assistant to the Nuffield professor of clinical medicine.

The following examiners have also been appointed :—

Organic chemistry, Mr. D. LL. Hammick; human anatomy, Dr. P. N. B. Odgers; human physiology, Prof. R. A. Peters, F.R.S.; pharmacology and therapeutics, Prof. J. H. Burn; pathology, Dr. A. D. Gardner; forensic medicine and public health, Dr. A. H. T. Robb-Smith; medicine, Dr. G. E. Beaumont; surgery, Mr. E. A. Crook; and midwifery, Mr. Victor Lack.

Royal College of Surgeons of England

Dr. A. J. E. Cave will give demonstrations of museum specimens on Nov. 18, 20 and 22. On Nov. 27 Sir Alfred Webb-Johnson will give the Bradshaw lecture, and the title of his discourse will be Pride and Prejudice in the Treatment of Cancer. On Dec. 5th Mr. T. P. McMurray will deliver the Robert Jones lecture and he will speak on the semilunar cartilages. All these lectures and demonstrations will be held at 2.30 P.M. at 1, Wimpole Street, London, W.1.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Nov. 5, with Dr. Alexander Goodall, the president, in the chair, Dr. Thomas Anderson (Glasgow) was introduced and took his seat as a fellow.

Dr. J. C. R Buchanan, Dr. J. H. Ewen and Dr. J. C. Caird were elected to the fellowship.

University of Manchester

Dr. J. C. Crighton Bramwell has been appointed professor of systematic medicine in the university and Dr. T. H. Oliver professor of clinical medicine.

Dr. Bramwell was born in Edinburgh, the son of Dr. Byrom Bramwell, and educated at Cheltenham College and Trinity College, Cambridge, where he obtained a first class in the natural sciences tripos. He qualified in medicine from the University of Manchester in 1915 and saw service with the R.A.M.C. in Egypt, France and Italy. After the war he returned to Manchester where he was appointed medical registrar at the Royal Infirmary and cardiologist to the Ministry of Pensions. During 1923–24 he held a Rockefeller scholarship under the M.R.C. and undertook research in diseases of the cardiovascular system at Washington University. Dr. Bramwell is physician to the Royal Infirmary at Manchester and consulting physician for women to St. Mary's Hospitals. He examines in medicine for the Universities of Cambridge and Aberdeen. In 1929 he was elected F.R.C.P. and in 1937 he delivered the Lumleian lectures on the arterial pulse in health and disease. He has also published papers on heart disease and pregnancy and is the author of Heart Disease, the Principles of Diagnosis and Treatment.

Dr. Oliver was also educated at the Universities of Manchester and Cambridge. After obtaining first-class honours in the natural sciences tripos in 1909 he graduated M.B. with honours from the University of Manchester in 1912. He held resident appointments at the Manchester Royal Infirmary and served as a major in the R.A.M.C. during the last war. Later he was appointed assistant director of the clinical laboratories at the infirmary, and was appointed to the honorary staff as physician. He holds the post of lecturer in systematic medicine in the University of Manchester and is examiner in therapeutics for the University of Cambridge. He is also tropical specialist on the Pensions Appeal Board. He has written on diabetes mellitus, achlorhydria and the glycosurias. He was elected F.R.C.P. in 1931.

Royal College of Obstetricians and Gynæcologists

The following have satisfied the examiners for the D.R.C.O.G.:—

H. I. C. Balfour, H. V. Corbett, Henry Doberman, Ruth Edmonds, J. B. Farquhar, M. L. Gaudin, Clement Grimshaw, Doreen M. Martin, Mary C. J. McCann, A. F. Pearson, H. P. Swan and R. H. White-Jones.

LOCK-UP SHELTERS.—Stoke Newington is experimenting with family air-raid shelters which will meet one of the more serious objections to communal shelters—their lack of privacy. The street shelter which was demonstrated a few days ago is divided into compartments 10 ft. by 4 ft. 6 in. which will each hold four adults and three children. Bunks are provided and there is room for a table, wireless set and apparatus for making tea. The idea is to allot the compartments to families who live nearby and to give them a key so that there will be no gate-crashers. The lock-ups are primarily intended for people whose houses have no garden or yard large enough to take an Anderson shelter.

Service Casualties

Temp. Surgeon Lieutenant S. P. H. Fergus, M.B. Leeds, H.M.S. *Venetia*, is reported to be missing presumed killed. The following R.A.M.C. officers are reported to be prisoners of war:—

W.S./Captain G. F. A. Caldwell, M.B. Glasg.; A./Major J. A. Chapel, M.D. Edin.; Lieutenant G. I. Davidson, M.B. Aberd.; Captain W. M. Davidson; Lieutenant W. W. Deane, M.R.C.S.; A./Major G. M. R. Duffus, M.B. Aberd.; Major W. R. Henderson, F.R.C.S.; Lieutenant G. S. A. Knowles, M.B. Lond; Lieutenant D. J. Macrae, M.B. St. And.; Lieutenant B. N. Mazumdar, M.R.C.S.; Lieutenant N. E. O'Neill, M.B. Sydney; Lieutenant Robert Pollock, M.B. Dubl.; Colonel W. A. Robertson, M.D. Edin.; Lieutenant I. F. Rose, M.B. Oxfd; Lieut.-Colonel T. A. S. Samuel, M.R.C.S.; Lieutenant Deryck Taverner, M.B. Leeds; and Lieutenant J. E. Woodling, M.R.C.S.

Mildmay Hospital, London

On Oct. 3 Mr. W. S. Pennefather opened ten new private wards at this hospital. At the outbreak of the war owing to the demand for trained women the Mildmay nurses who worked in the district were all called up except one, and it is the block in which they used to live that has been converted to make the new private wards.

At the annual meeting of the Royal Faculty of Physicians and Surgeons of Glasgow the following were elected office-bearers for the ensuing year :—

President, Mr. Roy F. Young; visitor, Mr. James H. MacDonald; hon. treasurer, Mr. William J. Richard; hon. librarian, Dr. W. R. Snodgrass; other councillors: Mr. J. Douglas Brownlie, Mr. J. Scouler Buchanan, Mr. Donald Duff, Dr. John Gardner, Dr. Stanley G. Graham, Dr. John Henderson, Dr. A. Brown Kelly, Mr. J. A. C. Macewen, Dr. Noah Morris, and Mr. William A. Sewell.

The Fellowship of Medicine will hold an M.R.C.P. course in chest diseases at the Brompton Hospital, on Mondays and Thursdays at 3.30 p.m. from Nov. 28 to Dec. 20. The course will be limited to six graduates. A course of afternoon demonstrations in neurology for M.R.C.P. candidates, and in orthopædics for F.R.C.S. candidates, will be arranged shortly. Further information may be had from the secretary of the fellowship, 1, Wimpole Street, W.1.

THE LANCET 1938–40.—Is any subscriber willing to part with these five bound volumes or a complete set of the issues unbound to form the nucleus of an E.M.S. hospital library ?

Appointments

BACON, L. J., B.Chir. Camb., D.P.H.: temp. asst. M.O.H. for Birmingham.
DIXON, PHYLLIS, M.B. Lond.: asst. welfare M.O. for Co. Durham.
GODFREY, N. G., M.B. Sydney, F.R.C.S.: R.S.O. at Stockport Infirmary.
MACFARLANE, R. G., M.D. Lond.: temp. asst. clinical pathologist at the Radcliffe Infirmary, Oxford.
MASTERTON, MARY, M.B. Edin.: asst. welfare M.O. for Co. Durham.
MUIR, A. J., M.B. Glasg., D.P.H., B.Hy. Durh.: M.O.H. and School M.O. for Todmorden.
ORMSTON, R. M. A., L.R.C.P.E., D.P.M.: asst. school M.O.H. for Burnley.

Births, Marriages and Deaths

BIRTHS

BLISS.—On Nov. 8, at Tavistock, the wife of Captain C. H. Bliss, I.M.S.—a son.
BUTCHER.—On Nov. 6, at Lincoln, the wife of Dr. H. G. H. Butcher—a son.
FRANKLIN.—On Oct. 27, the wife of Dr. Hugh Franklin, of Deddington, Oxon—a son.
HUGO.—On Nov. 11, at Guildford, the wife of Dr. Richard Hugo—a daughter.
KILPATRICK.—On Nov. 7 at Gerrards Cross, the wife of Mr. Frank Kilpatrick, F.R.C.S.— son.
MANSELL.—On Oct. 29, at South Mitford, Yorks, the wife of Dr. H. E. Mansell—a daughter.
WOLSTENHOLME.—On Nov. 5, at Sheffield, the wife of Lieutenant G. E. W. Wolstenholme, R.A.M.C.—a daughter.

MARRIAGES

BEHRMAN—ENGELBERT.—On Nov. 7, Simon Behrman, M.R.C.P., of London to Doris Engelbert.

DEATHS

COLGATE.—On Nov. 7, Henry Colgate, M.D. Lond., F.R.C.S., of Eastbourne, aged 89.
KIRK.—On Nov. 10, at Belfast, Thomas Sinclair Kirk, M.B. R.U.I.
MCCORMICK.—In November, by enemy action, George Franklin Hurley McCormick, M.R.C.S., L.D.S., of London, aged 40, and his wife.
MANSELL MOULLIN.—On Nov. 10, in London, Charles W. Mansell Moullin, C.B.E., D.M. Oxfd, F.R.C.S., Colonel R.A.M.C. (T.), aged 89.
TREADWELL.—On Nov. 7, at Woking, Oliver Ferreira Naylor Treadwell, M.R.C.S., L.S.A., aged 80.

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ORIGINAL ARTICLES

THE PHYSICS OF BLAST

By G. A. SUTHERLAND, M.A. Camb.
SPECIAL LECTURER IN PHYSICS, UNIVERSITY OF MANCHESTER

THE prime characteristic of any form of wave motion is that whereas the disturbance itself moves forward the particles of the medium through which it passes do not move with it but oscillate backwards and forwards about equilibrium positions. The oscillations may be either across or along the line of propagation. In water waves they are across it. Breakers on the seashore are not an example of wave motion, they are a tidal effect. But a cork on the surface of deep water over which waves are passing horizontally will simply bob up and down vertically. Such waves are called transverse waves. Where the oscillations are in the line of propagation the waves are called longitudinal waves. A simple example of a longitudinal wave or pulse is provided by a row of pennies in contact on a table. If one of the pennies is detached from the end of the row and a pulse started by flicking this penny so that it hits the near end of the row the result is that the penny at the other end is knocked off (fig. 1). The pulse has travelled

FIG. 1.

from end to end although the intermediate pennies keep their positions. What happens is that each penny is compressed in turn by the impact and in recovering passes the impulse on to the one next it. If a double pulse is imparted by flicking two pennies, one behind the other, against the end of the row then two pennies come off together at the other end (fig. 2).

Sound waves—and blast is simply an excessively intense sound wave—are similarly longitudinal; that is to say, the air particles propagate the disturbance by moving backwards and forwards in the line of the disturbance itself. For the sake of simplicity imagine that the origin of the blast is a small sphere of explosive material. When this is fired it expands suddenly and compresses a spherical shell of air immediately surrounding it. The air cannot avoid this sudden pressure but once it is released the elasticity of the compressed air in

FIG. 2.

the shell tends to make it recover its original state. In this it overshoots the mark, with the result that an outside shell is compressed in turn and a shell of rarefied air is left behind. Thus the sound pulse consists of a compression followed by a rarefaction and is propagated outwards. But the air particles move outwards from, or inwards towards, the centre according to the particular phase of the disturbance in which they are taking part at the moment.

The maximum movement of any air particle on each side of its normal undisturbed position is called the amplitude of the wave and clearly depends on the violence of the explosion. In the case of bomb explosions such as are now being experienced the amplitudes are considerable, for in the compression part of the wave pressures up to 200 atmospheres—i.e., 1½ tons per square inch—have been observed. Considering the excessive violence of bomb explosions, it is therefore not to be wondered at that the difference in degree between the effects of these and of normal sounds is mistaken for a difference in kind. But there is no warrant for the view that except within a few feet of the explosion the disturbance is different in character from a sound wave of high amplitude.

The phrase "beating the air" is commonly used to denote ineffectiveness. Beating the air *is* normally ineffective, simply because the mobility of the air generally makes it easy for it to escape round the edges of the beating object. The more sudden and violent the beating the less is this true, and the more will the air act not like a mobile gas but a rigid object. The so-called fluid flywheel in a car is supposed to damp out shocks between the engine and the transmission, and with such a mechanism and a suitable gear box it is possible to pass straight from forward to reverse gear. But if this is attempted at high speed it should preferably be done on someone else's car, for the shock to the transmission would be considerable. The makers' claim that at high speeds there is practically no slip and therefore practically no transmission loss is merely a claim that the liquid has acquired an unwonted rigidity by its very speed. Ironically this is also a claim that at such speeds it has lost the very property of absorbing transmission shock that is supposed to give it its great value. In a similar way the violence of blast makes its beating of the air so effective that it can bruise the walls of the lung as if they had been hit by a solid object.

Apart from the particular feature of wave propagation referred to there are other essential characteristics of wave motion which account for the apparently freakish behaviour of blast. There is, for example, the way it produces its effects on the far side of objects of considerable size. When a sound wave meets the wall of a room it does, it is true, set up a similar wave in the material of the wall itself which in turn produces a second air wave on the far side of the wall. But the attenuation in such a case is so great that the intensity of the transmitted wave is only about a millionth of that of the original wave and the amount of sound so transmitted is thus in most cases negligible. What does happen, however, is that the whole wall is itself set in vibration like a diaphragm and it is for this reason that homogeneous light partitions are so ineffective in shutting out sound. Similarly the more violent blast wave may produce so sudden a diaphragm movement of the outside wall of a shelter that, even if that movement is only a fraction of an inch, the impact of the solid wall may be violent enough to fracture the skull of anyone resting his head against it. This is the case with the wall of an enclosed space. But with a wall in the open the effect of the wave will appear on the far side in a third way, by bending round the edges. It is a matter of common experience that the interposition of even a large object does not prevent such bending nor provide any shelter except for a very small distance behind it. This again is a characteristic feature of wave motion. Any object to act as a screen must be comparable in size with the length of the wave in question. High-pitched sounds have short wave-lengths down to about a third of an inch but waves of sounds of the pitches that predominate in explosions may be as long as 30 feet. How effective even a wall 30 feet square would be in stopping a wave of 30 feet length would evidently depend on the distances both of the source and of the observer from the wall in question. Anyone who has watched the effect of a rock on waves in the sea will appreciate the point. A comparatively small rock will reflect back a ripple but long waves will bend round it almost as if it were not there.

In practice blast waves do meet objects that are large enough to reflect them and the original direction may be changed over and over again by successive reflection. Thus the effect may travel from side to side of a street flanked by high buildings for some distance, leaving a trail of damage in its wake. But such a phenomenon may have curious superposed anomalies—for example, certain points in the path of the wave may appear to be left out. This corresponds with the well-known phenomenon of deaf points in a badly designed auditorium and is the result of what is called interference. Direct and reflected waves superposed will reinforce each other if compression coincides with compression and rarefaction with rarefaction, but if they are out of step by half a wave-length so that compression and rarefaction coincide they will cancel each other out. In suitable circumstances "stationary waves" are formed and result in a series of points of cancellation and points of reinforcement.

The effectiveness of a dividing wall in shutting out sound is a simple function of the weight per square foot

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and what applies to sound in general also applies to the particular case of blast. With a homogeneous wall it does not matter what the wall is made of, this law of weight is true. But it is not only solid objects that divert a sound wave from its path; atmospheric conditions can produce surprising results. Varying temperature at different heights can divert a wave upwards. Striking a column of hot air may throw the wave back in the direction from which it has come. The sound of gunfire, for example, would be much enfeebled if there were a fire between the gun and the observer. Such measures, however, cannot be applied for practical protective purposes, which must still rely for their effectiveness on adequate weights of material between the source and the observer or victim.

CHEMOTHERAPY OF CEREBROSPINAL FEVER IN CHILDHOOD

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This report[1] covers 102 cases of cerebrospinal fever admitted to Alder Hey Children's Hospital, Liverpool, between Jan. 1 and May 31, 1940. Since January, 1939, all cases of meningitis admitted have been treated by chemotherapy alone. All patients were under 16 years of age.

ROUTINE TREATMENT

Lumbar puncture is performed on every case on admission, and the organism is typed. If the fluid is turbid sulphanilamide is given immediately. Sulphanilamide is used because it is much more readily tolerated by children than M. & B. 693 and causes less vomiting; it is also cheaper, and for a time M. & B. 693 was difficult to obtain. The powdered form of sulphanilamide is made up into a suspension as follows:—

Sulphanilamide ..	gr. 24	Tragacanth	gr. i
Tinct. aurant.	℥ iii	Aqua	ad oz. i

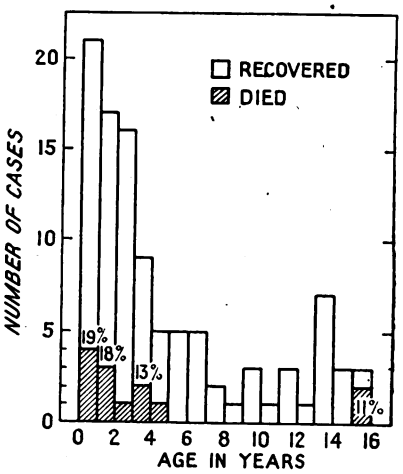
If there is any vomiting the lost dose is immediately readministered. In a few cases M. & B. 693 has been given at the same dosage rate, intravenously as M. & B. 693 soluble whenever necessary, and in tablet form when there has been an accompanying bronchopneumonia or, in chronic cases, to alternate with sulphanilamide. Administration is continued for 10 days in an ordinary case but the time may be decreased if toxic symptoms appear and lengthened if the cerebrospinal fluid is not sterile on the tenth day. A second lumbar puncture is performed after 24 hours' treatment, the fluid is cultured and its sulphanilamide content estimated; if this is adequate (over 5 mg. per 100 c.cm.) and the fluid is sterile no more lumbar punctures are performed until the tenth day. If the concentration is insufficient, however, the dose of sulphanilamide is adjusted until the required concentration is reached and the punctures repeated until the fluid is sterile. A lumbar puncture is always performed on the tenth day. If the fluid is clear and sterile and the child's general condition is normal treatment is then discontinued. Fluids are given freely throughout. Most children take fluids readily to the extent of several pints a day but where there is much vomiting and dehydration continuous intravenous-drip saline may be necessary. This has often proved a life-saving measure. Regular blood-counts are done, and ferrous and ammonium citrate in suitable doses is given as soon as the child begins to take solid food.

RESULTS

The age-incidence in the series is shown in table I and the figure. It will be seen that a large proportion (53%) of cases occurred in the first three years of life. Out of 102 cases 13 died, the case-fatality rate being 12·7%. Of these 13 only 7 received adequate therapy for periods varying from twenty-four hours to thirty days; they were found at autopsy to be without complications. Of the other 6 deaths, 1 occurred two hours after admission, in a patient who had received an initial dose of sulphanilamide; 2 in the early part of the epidemic occurred twenty and twenty-two hours after admission, and further experience suggests that they might have been avoided by intravenous saline therapy; 2 cases, both complicated by bronchopneumonia and having received an inadequate dosage of sulphanilamide or sulphapyridine, died in just over twenty-four hours, one having been ill for five weeks at home. The final case appeared to be improving but respiratory symptoms developed on the third day, and she died on the fifth day; post-mortem examination revealed a clearing meningitis and extensive pulmonary tuberculosis.

TABLE I—AGE AND CASE-FATALITY RATE

Age (years)	Cases	Deaths	Case-fatality rate (%)
0– 1	21	4	19
1– 2	17	3	17·6
2– 5	30	4	13·3
5–10	16	0	0
10–15	18	2	11·1
Total	102	13	12·7



The most favourable age-group was five to ten years, in which there were no deaths. The 2 deaths in the cases over ten years were those mentioned above which might have been avoided by intravenous therapy. The case-fatality rate of 19% amongst the infants is perhaps the most striking testimony to the value of adequate sulphanilamide therapy.

TABLE II—GROUPS OF ORGANISMS AND CASE-FATALITY RATE

Group	Cases	Deaths	Case-fatality rate (%)
I	79	9	11·4
II	17	3	17·6
Indeterminate	2	0	0
Not typed	4	1	25·0
Total ..	102	13	12·7

The meningococci were grouped at the Alder Hey Laboratory and all specimens were sent to the City Laboratory, Liverpool, for confirmation. In the 102 cases, 79 (77·4%) were group I and 17 (16·7%) group II; in 2 the group was not determined as the strains agglutinated equally well with both group sera and 4 were not typed.

DOSAGE AND CONCENTRATION

Sulphanilamide by mouth was given alone to 94 cases; 3 were treated with M. & B. 693 alone and 5 had both drugs. In this last group 2 became chronic, and the drugs were therefore alternated in periods of about 14 days over a total period of six to eight weeks; 2 were given M. & B. 693 for a few days because cerebrospinal fluid on the tenth day was not sterile and the fifth received M. & B. 693 soluble intravenously at the beginning of treatment for the first 4 doses because oral therapy

1. I have omitted 6 further cases, of which 1 was brought in dead, post-mortem lumbar puncture confirming the diagnosis; 2 were only in hospital a few hours and received no treatment; and 3 had signs of meningitis with typical findings in the cerebrospinal fluid and responded well to sulphanilamide, but no meningococci were demonstrated.

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proved impossible. Two cases received serum intrathecally and intramuscularly.

The dosage of sulphanilamide was calculated on a minimum of 0·08 g. per pound of body-weight per day, and an initial dose equivalent to at least half of the total daily dose was given; after that the drug was given 4-hourly. For infants under 1 year, 0·13–0·2 g. per pound of body-weight was given. The average dosage worked out as follows:—

Years	Initial dose	Daily dose
0– 1	1·5 g.	2·5 g.
1– 2	2 g.	2·5 g.
2– 5	2 g.	3 g.
5–10	3 g.	4·5 g.
10–15	5 g.	7 g.

The sulphanilamide content of the cerebrospinal fluid was estimated by the method described for blood and urine by Werner (1939), using Ehrlich's reagent as an indicator; a concentration of over 5 mg. per 100 c.cm. was thought to be adequate, although higher concentrations than this were often obtained. The concentration tends to fall during the period of treatment and there did not appear to be any constant relation between sulphanilamide content and fatality-rate.

Of the total of 90 lumbar punctures performed at the end of twenty-four hours' therapy, 69 (76·7%) were found to be sterile. Of these cases, 3 died, and in 2 others the cerebrospinal fluid gave positive cultures later, but finally cleared up.

COMPLICATIONS

In 9 cases (8·8%) purpura was present on admission or developed during treatment; 1 of these died. There appeared to be no greater tendency to the development of anæmia or other toxic manifestations in this group. In 6 cases there was labial herpes, in 2 very severe.

Paralysis of the sixth cranial nerve occurred in 5 cases, and of the seventh in 3. All these recovered from their meningitis and the cranial-nerve palsies cleared satisfactorily. Nerve deafness developed and persisted in 1 child, and he became difficult to manage; it was not clear whether this behaviour difficulty was due to deafness or to mental changes. No other patient showed mental deterioration, though this may become evident later in the infants if they develop hydrocephalus. No cases of hydrocephalus became evident during treatment. In 1 patient iritis developed, causing posterior synechiæ.

Any case in which the cerebrospinal fluid was not clear and sterile within fourteen days was considered to have become chronic. There were 3 such cases, and of these 1 died. The duration of the infection varied from thirty to fifty-eight days, and sulphanilamide or M. & B. 693 was administered alternately throughout the whole period; serum was given later in 2 cases but did not appear to have any significant effect—indeed, the patient who died received serum. In spite of the long illness there were no toxic manifestations from the sulphanilamide or complications of meningitis, but convalescence was more prolonged and difficult.

During sulphanilamide therapy all sulphur-containing foods and purgatives were withheld; in spite of this almost every case became cyanosed though with no apparent ill effects. In no case was cyanosis considered to be an indication for therapy to be discontinued. A morbilliform eruption, appearing towards the eighth or tenth day of treatment, occurred in 6 cases, and when it appeared and the condition of the child allowed it the drug was either discontinued or the dosage reduced. All these cases recovered.

In most cases there was a definite leucocytosis, the average white-cell count in 32 cases during the first three days being 24,000. As a rule this gradually fell during treatment. There were no examples of true agranulocytosis. In many cases red-cell counts were made in the first twenty-four hours, on the second day and then at varying intervals during treatment. It was not found possible to take blood-counts at absolutely regular intervals. In all, 160 counts were performed on 71 patients. In 16 the red-cell count fell slightly, as it might in any infection; in 21 there was no significant change; in 26 only one count was performed; in 8 cases a very severe anæmia developed. The characteristics of this anæmia were the sudden appearance of immature red cells—normoblasts and megaloblasts—in the circulating blood, and a sudden drop in red cells and hæmoglobin accompanied by marked anisocytosis and poikilocytosis: a picture compatible with intense bone-marrow disturbance or severe hæmolysis. Jaundice was never noticed. The general condition of the child deteriorated rapidly and blood-transfusion was almost always necessary, leading to a rapid improvement. This sudden anæmia appeared early in the treatment, from the third to the ninth day, and in only 2 cases was the child receiving an unusually large dose of sulphanilamide. In these cases the condition of the meningitis and not that of the hæmopoietic system was the basis of further regulation of the dosage of sulphanilamide or M. & B. 693. All these children recovered. In the 2 cases which received sulphanilamide or M. & B. 693 almost continuously for a period of more than 6 weeks, anæmia did not develop. These findings suggest that it is the susceptibility of the individual hæmopoietic system rather than the amount of the drug administered that determines the onset of this anæmia.

SUMMARY

Of 102 cases of cerebrospinal fever in patients under sixteen years of age treated with sulphonamides the case-fatality was 12·7%; in 54 under three years the rate was 14·8%, and in 21 under one year it was 19%. Sulphanilamide alone was given to 94 patients, the average daily dosage varying from 2·5 g. in infancy to 7 g. in older children and the usual period of treatment being ten days. Adequate initial dosage was considered to be of paramount importance. In 3 cases M. & B. 693 was given alone, and in 5 cases combined with sulphanilamide. Two cases received serum intrathecally and intramuscularly. Fluids were administered liberally, if necessary parenterally, and an iron mixture was given during convalescence.

Complications of sulphanilamide therapy were cyanosis, morbilliform eruptions and sometimes severe anæmia.

I wish to thank Dr. W. E. Crosbie, medical superintendent of Alder Hey Hospital, for permission to publish these cases, Dr. N. B. Capon and Prof. H. D. Wright for advice, Dr. Scott of the Ministry of Health for permission to make use of the results of his grouping, and Mr. A. C. Dawkins, senior technologist at Alder Hey Hospital, for his assistance in the laboratory.

The outpatient department of the Maudsley Hospital, Denmark Hill, S.E.5, will be reopened on Monday, Nov. 25. Outpatients should be sent to the hospital if possible by their own doctor and an appointment should be made beforehand. Hours of attendance at the hospital for adults are 9.30 A.M. to noon on Mondays, Wednesdays and Fridays. Children can also be seen during the Monday sessions. Appointments for adults may be made by 'phone at Rodney 3841 during hours of attendance and at Vigilant 0054 at other times. Appointments for children should always be made at Mill Hill 4276. All letters should be addressed to the medical officer in charge at the Maudsley Hospital.

The Carolinian Hospital, which stands near the city limits of Stockholm, was opened at the end of September by the King of Sweden. It has 1200 beds and can also treat a large number of outpatients. Special departments, such as the cancer hospital, the psychiatric clinic and the Cripples Hospital are each housed in separate buildings grouped round a huge central block. Large wards have been abolished in favour of smaller rooms and a standard unit is only intended for 25 patients and comprises, as a rule, two 6-bed, three 3-bed, one 2-bed and two single-bed wards. There is a personnel and staff of over 1300 persons and special buildings within the hospital area have been erected for them so that they may spend their free time away from their work. In many respects the hospital breaks with tradition. For instance there are bars where beer is obtainable, and smoking-rooms are provided. The very large bomb-proof underground quarters—which were not included in the original plans—are blasted out of the rock on which the hospital stands. The hospital has been built with money granted by the state and contributions from the city and district of Stockholm. The cost so far has been about £2,060,000. The Carolinian Institute with which the hospital is associated is Sweden's principal medical school and has an average of 1000 students, and the new hospital will provide the institute with more centralised observation facilities, as well as with new technical and scientific resources.

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DEFICIENCY OF VITAMIN C AND VITAMIN P IN MAN*

BY HAROLD SCARBOROUGH, M.B., Ph.D. Edin.

(From the Clinical Laboratories, Royal Infirmary, Edinburgh)

BENTSÁTH et al. (1936, 1937) first suggested that the full clinical syndrome of scurvy in the guineapig was produced by a combined deficiency of vitamins C and P. This suggestion was based on experiments said to show that the length of survival of guineapigs on the Sherman-La Mer-Campbell scurvy-producing diet could be increased from 28·5 to 44 days by the administration of supplements of vitamin P. At autopsy the animals which had received these supplements showed significantly fewer hæmorrhages in the tissues. It was concluded that a deficiency of vitamin P is in part responsible for the hæmorrhages of scurvy, which should therefore be regarded as a mixed deficiency of vitamins C and P. It was considered that clinical signs of a deficiency of vitamin P alone could not be produced in the guineapig. Zilva (1937) has shown that the post-mortem appearances described by Bentsáth and his colleagues in the animals treated with supplements of vitamin P closely resemble the condition found in guineapigs receiving minute doses (0·1 mg. daily) of ascorbic acid. Zilva (1937) and Moll (1937) could not find any evidence for the existence of vitamin P from dietary experiments with guineapigs. Szent-Györgyi (1937, 1938) has since reported his failure to repeat his original experiments upon which the existence of vitamin P was based.

The problem of vitamin P has been studied again more recently (Scarborough 1939). A low capillary resistance in people with various forms of nutritional deficiency was found to be associated with a deficiency of vitamin P, but no clinical syndrome was described. Zacho (1939) observed that the capillary resistance of scorbutic guineapigs could only be restored to normal by the addition of ascorbic acid and vitamin P to the diet. Moreover, less hæmorrhage was found at autopsy in scorbutic animals treated with vitamin P. Todhunter et al. (1940) have found that scorbutic guineapigs receiving supplements of lemon-juice show fewer hæmorrhages than do animals receiving equivalent amounts of pure ascorbic acid.

The present communication demonstrates the existence of deficiencies of both vitamin C and vitamin P in man. In two cases clinical evidence of a deficiency of vitamin P alone has been induced experimentally.

MATERIAL AND METHODS

The six people studied in this investigation all had a clinical deficiency of vitamins but, apart from this, were free from other obvious organic disease, except case 1, whose blood gave a positive Wassermann reaction. Cases 4, 5, and 6 gave a history of chronic alcoholism. All were in bed in hospital during the investigation. On admission each patient was immediately submitted to rigid dietary control, the diet being as far as possible free from vitamins A, the B complex, C, D, and E. Insufficient is known about vitamins K and P to permit their certain exclusion from a human dietary. The calorific value of the diet was unrestricted.

Vitamin P was administered as an active fraction prepared from oranges, but the precise nature of the active substances present in the fractions has not been determined. For oral administration two different fractions were used: (1) a crude yellow powder deposited spontaneously during the desiccation of Californian Valencia orange-juice; and (2) a purer preparation obtained from (1) by extraction with pyridine and repeated crystallisations from aqueous pyridine. In case 5 vitamin P was administered parenterally; the preparation used was an aqueous solution (50 mg. in 1 c.cm.) of flavanones prepared from orange peel according to the method described by Szent-Györgyi (1938). The same preparation was also given by mouth to case 5. All of these fractions were free from ascorbic acid. In most cases ascorbic acid and vitamin-P concentrates were given by mouth, the former in solution, the latter as an aqueous suspension (1 g. in about 50 ml. of water).

The capillary resistance was determined by a positive-pressure technique. In this procedure the capillaries are ruptured by an increase of intracapillary pressure produced by the application of venous obstruction to the arm for a certain time. The ruptured capillaries are enumerated as petechial hæmorrhages in the forearm after release of the pressure. The pressure (mm. Hg) and the time (min.) for which it was permitted to act are indicated in each case in the upper left-hand corner of each chart. The pressure varies with each patient and is regulated so as to be just infradiastolic. The time for which the pressure is permitted to act is varied according to the response obtained. Thus, if the capillary resistance is low, many petechiæ will be induced in a short time; whereas, if the capillary resistance is high, a longer period of occlusion will be required before petechiæ can be enumerated in the forearm.

The capillary resistance is determined in terms of the number of petechiæ produced. A normal capillary resistance by this method is 0–20 (mean $\pm 2\sigma$). A decrease in the number of petechial hæmorrhages under these conditions is accordingly taken as a sign of an increased capillary resistance. Capillary-resistance determinations are recorded as a graph. Spontaneous hæmorrhages are recorded as vertical lines on the charts. The amount of this hæmorrhage has been roughly assessed by determinations of the total area (sq. cm.) of surface hæmorrhage. In cases 3 and 4 body-weight (in kg.), hæmoglobin level (as a percentage of the normal; 100% = 16·0 g. per 100 c.cm.), and knee flexion (in degrees) have also been determined (figs. 3 and 4). By the last term is signified the angle to which either the right or the left leg can be flexed on the thigh at the knee. In scurvy movement at this joint is often limited, in the absence of hæmarthrosis, because of either pain or hæmorrhage into the muscles of the thigh. Figs. 3 and 4 show that the measurement of this angle is a convenient and satisfactory guide to the progress of the scorbutic process in the early stages of treatment.

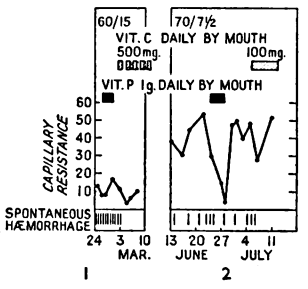

FIG. 1—Chart of case 1, showing that the capillary resistance was within normal limits, and that administration of vitamin P did not control the subcutaneous hæmorrhages, which, however, were arrested immediately by the administration of ascorbic acid.

FIG. 2—Chart of case 2, showing that the administration of vitamin P increased the capillary resistance but did not arrest the spontaneous hæmorrhages, whereas the administration of ascorbic acid stopped the hæmorrhage at once, although it did not affect the capillary resistance.

RESULTS

CASE 1.—A widower, aged 62, had had two weeks' pain, ecchymosis, and œdema of both legs. He had lived alone for nine months, during which his diet had contained no fruit, green vegetables, or meat. There was no history of alcoholism. His blood gave a strongly positive Wassermann reaction. There was slight œdema. Subcutaneous hæmorrhage: 74 sq. cm. Diagnosis: scurvy.

Fig. 1 shows that on admission and throughout the period during which observations were made his capillary resistance was within normal limits. Administration of vitamin P did not control the subcutaneous hæmorrhages, which, however, were arrested immediately by the administration of ascorbic acid.

CASE 2.—A female, aged 37, with four years' weakness, intermittent diarrhœa, dyspepsia, and dyspnœa on exertion. A month before admission she developed swelling and bleeding of the gums. Owing to diarrhœa and dyspepsia her diet had been restricted for the last six weeks almost entirely to bread,

* The work reported here formed part of a study of vitamin deficiencies carried out during the tenure of a Beit Memorial Fellowship in 1939.

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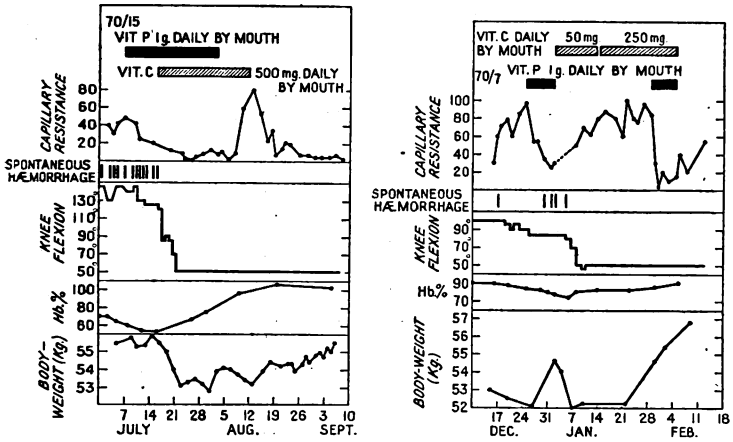

FIG. 3—Chart of case 3, showing that the administration of vitamin P did not arrest the subcutaneous hæmorrhages, which, however, were controlled immediately by the administration of ascorbic acid, whereas the capillary resistance was increased by the administration of vitamin P but not of ascorbic acid. The amount of knee flexion indicates the progress of the scorbutic process in the early stages of treatment.

FIG. 4—Chart of case 4, illustrating the same effects as does fig. 3 and showing further an increase of capillary resistance produced by the administration of vitamin P both before and after treatment of the scorbutic condition with ascorbic acid.

margarine, jam, and tea. Before then it had been deficient in fruit and green vegetables. There was no history of alcoholism, and the blood gave a negative Wassermann reaction. There was no clinical œdema. Subcutaneous hæmorrhage: 8 sq. cm. Diagnosis: scurvy.

Fig. 2 shows that the administration of vitamin P caused an immediate and definite increase of capillary resistance but did not arrest the spontaneous hæmorrhages; these, however, were controlled at once by the administration of ascorbic acid, which also arrested the gingival bleeding within three days. The capillary resistance was not controlled by the administration of ascorbic acid.

CASE 3.—A bachelor, aged 65, with three weeks' swelling, pain, and discoloration of both legs. His diet had consisted for many years mainly of margarine, jam, white bread, sausages, and tea. Three years previously he had been in hospital with scurvy. There was no history of alcoholism. The blood gave a negative Wassermann reaction. There was no clinical œdema. Subcutaneous hæmorrhages: 26 sq. cm. Diagnosis: scurvy.

CASE 4.—A chronic alcoholic bachelor, aged 54, had lived alone for many years on a grossly deficient diet. Three weeks before admission he had had to give up his work as a butcher because of weakness and dyspnœa on exertion. He also had "muscular rheumatism" in the shoulders and arms and pain and stiffness in both legs. Three days before his admission to hospital several large ecchymoses appeared on the legs. The Wassermann reaction of the blood was negative. There was slight œdema. Subcutaneous hæmorrhage: 56 sq. cm. Diagnosis: scurvy.

Figs. 3 and 4 again show that the administration of vitamin P did not arrest the subcutaneous hæmorrhages, which, however, were controlled immediately by the administration of ascorbic acid. The capillary resistance in both cases was increased by the administration of vitamin P but not of ascorbic acid. In case 4 this has been shown to happen both before and after treatment of the scorbutic condition with ascorbic acid.

During the period of treatment with vitamin P the body-weight remained constant in case 3 but increased in case 4, the percentage of hæmoglobin decreased in both cases, and there was only slight improvement in the angle of flexion in both cases. Administration of ascorbic acid was associated in both subjects with a prompt fall in body-weight, owing to the loss of excess tissue fluid, and with an increase in the percentage of hæmoglobin, and the angle of flexion immediately returned to normal. During the period of treatment with vitamin P the clinical condition of neither case showed any improvement such as is always noted in scurvy within twenty-four hours of the administration of a large dose (500 mg.) of ascorbic acid.

No evidence has yet been adduced that a deficiency of vitamin P plays any part in the production of scurvy in man, and it is therefore pertinent to inquire whether there is any clinical syndrome produced by, and characteristic of, a pure deficiency of vitamin P. Since this question is most satisfactorily answered by the production of an experimental deficiency, the following two cases were investigated to determine whether or not clinical evidence of a deficiency of vitamin P could be induced by experimental feeding. The procedure was, briefly, to take two patients already showing clinical signs of deficiency of vitamins, to give them the "vitamin-free" diet already described, and to add thereto supplements of vitamins A, B_1, C, and D in doses sufficient to correct any deficiency of these vitamins. Capillary resistance was determined repeatedly to assess any deficiency of vitamin P.

CASE 5.—A chronic alcoholic bachelor, aged 54, had lived alone on a diet deficient in fruit and green vegetables. For six months before admission he had become increasingly weak and breathless on exertion. For the last six weeks he had had vague pains in the legs, and two weeks before admission he had noticed that he bruised easily. He subsequently developed spontaneous hæmorrhages in both legs, and spongy gums with gingival bleeding. The Wassermann reaction of the blood was negative. Clinical œdema was absent. Spontaneous hæmorrhages: 54 sq. cm. Diagnosis: scurvy.

Fig. 5 records this man's capillary resistance during four months on the "vitamin-free" diet. The chart shows that the administration of vitamin P by mouth in doses of 1 g. a day for seven days did not arrest the spontaneous hæmorrhages but did increase the capillary resistance, which effect was reproduced on a second occasion. Administration of 100 c.cm. of lemon-juice

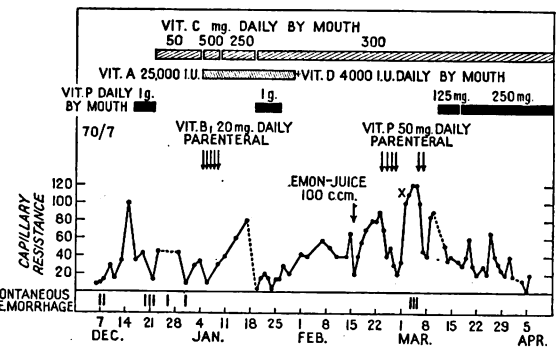

FIG. 5—Chart of case 5, showing that the administration of vitamin P did not arrest the spontaneous hæmorrhages but did increase the capillary resistance, whereas the administration of ascorbic acid arrested the spontaneous hæmorrhages but did not affect the capillary resistance. Pains and petechiæ occurred at X and were cured by the administration of vitamin P.

produced an immediate response, as also did the intramuscular injection of a vitamin-P preparation (50 mg. a day for four days). The spontaneous hæmorrhages were arrested by the administration of ascorbic acid, which did not, however, increase the capillary resistance. Administration of ascorbic acid (300 mg. a day by mouth) was continued throughout the experiment. Large doses of vitamins A and D by mouth and of vitamin B_1 parenterally were given over the periods shown in the chart. In spite of these measures the capillary resistance continued to fall. At the point X on the chart the patient began to have pain across the shoulders and in the arms. He complained of weakness, lassitude, pain in the legs, and "tired feet" when he walked. At this point spontaneous petechial hæmorrhages appeared on the legs. These were at first confined to an area at the level of the upper part of the boots but later developed both below and above this line. Petechial hæmorrhages were also present in the skin over both wrists and were induced immediately in both arms by the application of a tourniquet. The patient was now given a vitamin-P preparation by mouth

in doses of 125 mg. a day, and seven days later 250 mg. a day. The symptoms disappeared within forty-eight hours, and there was no further petechial bleeding. The capillary resistance gradually returned to the normal level.

CASE 6.—A bachelor, aged 56, with a history of chronic alcoholism, complained of dyspnœa on exertion, which had developed suddenly three weeks before admission. This was followed, three days before admission, by the sudden appearance of œdema of the legs and scrotum severe enough to prevent his getting about. There was anorexia and a prolonged history of neuritic pains in both arms. His diet had consisted for over a year mainly of carbohydrate foods. It included refined cereals and white bread in large amounts, jam, margarine, tinned milk, and meat. The Wassermann reaction of the blood was negative. There was œdema but no subcutaneous hæmorrhage. Diagnosis: "Beriberi heart." The diagnosis was supported by electrocardiographic evidence and by determination of the vitamin-B_1 content of the blood, which showed only a trace to be present.

Fig. 6 shows the effect of vitamin P in increasing the capillary resistance. Enormous doses of vitamins A (given parenterally and by mouth) and D (by mouth), B_1 (given parenterally and by mouth) and C (by mouth) did not control the capillary resistance, which progressively decreased to the point X on the chart, when the patient had "rheumatic pains" across the shoulders. He also complained of feeling tired and of "tightness" in both legs and pain in the feet and ankles, especially on exertion. Spontaneous petechial hæmorrhage was noted in the left forearm one morning when he awoke. Petechial spots developed the same day over the left ankle

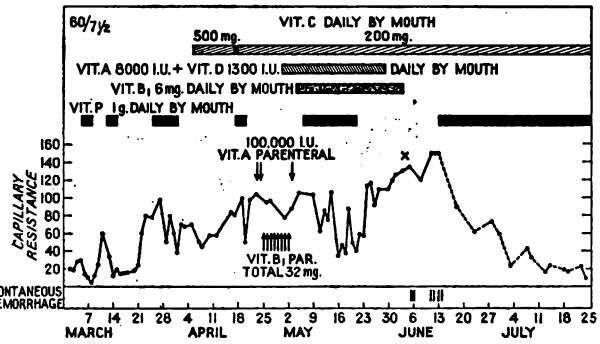

FIG. 6—Chart of case 6, showing the effect of vitamin P in increasing the capillary resistance, whereas large doses of other vitamins exerted no such effect. Pains and petechiæ occurred at X and were relieved by the administration of vitamin P.

and in the flexure of the elbow on the right side. Application of the tourniquet to the arm immediately produced petechiæ too numerous to count. Vitamin P was now administered by mouth in doses of 1 g. a day. The symptoms were relieved within forty-eight hours, and no further hæmorrhages developed. The capillary resistance progressively returned to the normal level.

The results of a hæmatological investigation made on these two men when the spontaneous petechial hæmorrhages developed are given in the accompanying table.

RESULTS OF HÆMATOLOGICAL INVESTIGATIONS

Heparinised venous blood was used for the examinations marked *

	Case 5	Case 6
*Erythrocytes (millions)	4·7	5·1
*Packed cell volume (Wintrobe)	40%	46%
*Hæmoglobin g. per 100 ml. (Newcomer)	16·2 (96%)	16·0 (95%)
*Indices: Colour-index (uncorrected)	1·02	0·93
*Indices: Volume-index (uncorrected)	0·95	1·00
*Indices: Saturation-index (uncorrected)	1·07	0·94
*Indices: Icteric index	4·0	6·0
*Reticulocytes	<1%	<1%
Blood sedimentation-rate (Westergren) (mm. in 1st hour)	5·5	2·0
*Leucocytes	4800	6000
*Differential count (500 cells):		
Polymorphs	60%	71%
Eosinophils	2%	1%
Basophils	0·5%	0·3%
Lymphocytes	26%	20%
Monocytes	10%	8%
Transitional cells (metamyelocytes)	1·5%	0%
Thrombocytes (indirect)	400,000	350,000
Coagulation-time (capillary tube)	10 min.	7 min.
Bleeding-time (Duke)	5 min.	7 min.
Clot retraction (Macfarlane)	Normal	Normal
*Plasma protein g. per 100 ml.	6·7	7·0
*Plasma fibrinogen g. per 100 ml.	0·18	0·21
Plasma prothrombin (Quick)	100%	102%
Serum calcium mg. per 100 ml.	9·0	8·7

COMMENTS

It is clear from the table that in neither case 5 nor case 6 was there any hæmatological abnormality which could explain the spontaneous bleeding. Since a much-increased fragility of the capillary walls (low capillary resistance) was determined in both cases, it is concluded that the spontaneous petechial hæmorrhages were due to this excessive fragility. The fact that these hæmorrhages appeared in areas of skin subjected to the external pressure of tight clothes or to the internal strain of an increased venous pressure either in the legs because of an erect posture or in the arms if the venous return is obstructed supports this conclusion. The increased fragility of the capillary walls, which ultimately leads to the development of petechial hæmorrhage, is regarded as an expression of a deficiency of vitamin P.

The experiments reported here show that at least two forms of subcutaneous bleeding may develop as the result of nutritional deficiency in man. One form is due to a deficiency of ascorbic acid and is arrested promptly by the administration of this substance but not of vitamin P. It is not necessarily accompanied by a low capillary resistance, although, since dietary deficiency in the human subject is almost always multiple, it is often associated with a decreased resistance. A decreased capillary resistance is an expression of a deficiency of vitamin P and is increased promptly by the administration of this vitamin but not of ascorbic acid. Spontaneous petechial bleeding may develop when the capillary resistance is low. It is associated with feelings of lassitude and easily induced fatigue and with pains in the shoulders and legs. It is an expression of a deficiency of vitamin P and is controlled by the administration of this vitamin.

The two forms of hæmorrhage are different in appearance. The hæmorrhages characteristic of a deficiency of ascorbic acid are large (ecchymoses) and involve considerable areas of subcutaneous tissue and muscle. The gingival bleeding which develops in scurvy is an expression of a deficiency of vitamin C and is not controlled by the administration of vitamin P. The hæmorrhages developing as the result of a deficiency of vitamin P are always small (petechiæ) and take place in the skin. They are often circumpilar. Both forms of hæmorrhage tend to appear first, and are often more severe in parts exposed to the pressure of clothing and in the legs because of the higher venous pressure in that part.

It is possible that some forms of purpura may have a nutritional basis; some support for this view has already been obtained (Scarborough and Stewart 1938).

CONCLUSIONS

The administration of vitamin P does not control the large subcutaneous hæmorrhages characteristic of the scorbutic state. These hæmorrhages are arrested within twenty-four hours by a large dose (500 mg.) of ascorbic acid.

The administration of vitamin P has no effect on other important manifestations of the scorbutic state—tissue hydration, anæmia, knee flexion, and general clinical condition.

The administration of vitamin P can produce an increased capillary resistance in the scorbutic subject either before or after treatment with ascorbic acid. The capillary resistance of such subjects is not controlled by the administration of ascorbic acid or of vitamins A, B_1 or D.

A deficiency of vitamin P may exist in man even when he has been taking large doses of ascorbic acid for prolonged periods. Its clinical manifestations include pains in the legs on exertion, pain across the shoulders, weakness, lassitude, and fatigue. It is invariably associated with a much-decreased capillary resistance and may be characterised by the development of spontaneous petechial hæmorrhages, especially in areas exposed to pressure. It has not been found to be

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accompanied by any hæmatological abnormality. It responds to treatment with vitamin P. The precise chemical nature of the vitamin remains to be determined.

My thanks are due to Prof. D. M. Dunlop, in whose wards this work was carried out; to Sister Buchan, of the dietetic department of the Edinburgh Royal Infirmary, to whose care the success of the experiments is largely due; and to Mr. A. Crosbie for help with the capillary-resistance determinations.

The ascorbic acid and vitamin P used in these experiments were obtained through the courtesy of Mr. A. L. Bacharach, of Glaxo Laboratories Ltd. I am also indebted to Roche Products Ltd. for a gift of material.

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ACUTE IDIOPATHIC PORPHYRY

WITH REPORT OF A CASE

By Leo Rau, M.D. Berlin, M.R.C.P.

Idiopathic porphyry used to be called hæmatoporphyrinuria; the name is incorrect, because other porphyrins may also be present in the urine. The Hoppe-Seyler hæmatoporphyrin is a complex pigment produced outside the body in a test-tube by the action of strong sulphuric acid on hæmoglobin. Other porphyrins have in common the fact that they are found in similar clinical syndromes, which may be classified as follows:

1. Normal porphyry depending on absorption from food.
2. Congenital porphyry with photosensibility, skin lesions, and pink teeth.
3. Symptomatic porphyries, acute and chronic, which may be further subdivided into abdominal and nervous forms of acute idiopathic porphyry; and toxic porphyry occurring in disease of the liver (including toxic poisoning), blood diseases such as hypochromic and hyperchromic anæmias, chronic poisoning with sulphonal, trional, or sodium barbitone, acute poisoning with procaine, lead poisoning, sulphanilamide treatment, Korsakoff's syndrome, pellagra, and rheumatic and allergic diseases.

In all these cases the porphyrin may be found in the urine, fæces, bile, blood, and cerebrospinal fluid (C.S.F.). The clinical picture of acute lead colic is almost identical with that of a severe acute attack of idiopathic porphyry; moreover, some cases of acute lead poisoning present the typical symptoms and signs of acute peripheral neuritis and encephalopathy as observed in cases of acute idiopathic porphyry.

H. Fischer, Rimington[1] and others have investigated the chemical structures of all the known porphyrins and shown that they are iron-free hæmoglobin, but their physiology is still obscure. Bilirubin, another iron-free hæmoglobin, was found, in the case described below, immediately after the disappearance of the porphyrin from the urine; but whether the metabolism of these two iron-free hæmoglobins, porphyrin and bilirubin, is related is also unknown. Many of the acute toxic porphyries and their complications disappear or improve gradually on treatment by injections of liver extracts or with vitamin B_1 or with vitamin B_2 complex. The porphyrin appears to have a selective action on the nerves. In the following case of acute idiopathic porphyry the diagnosis was made by recognising the excreted uroporphyrin by direct spectroscopy and by the fluorescent method under the Wood filter with ultraviolet rays.

CASE-REPORT

An unmarried woman aged 30, while in a cinema on March 25, suddenly felt giddy and had a bad headache and nausea but did not vomit. It was the first day of a menstrual period Her temperature that night was 103° F., pulse-rate 70–80 The symptoms persisted and got worse at times, but there was no vomiting and no abdominal pain. She was constipated.

Past history.—No contact with lead could be recalled, nor had any drugs been taken. No abnormal colour of the urine had been noticed. The periods had always been normal and regular. There had been no pigmentation or sensibility to light. The weight had varied between 8 st. 11 lb. and 9 st. 13 lb. She had never had jaundice, the spleen had never been found enlarged. She had no allergic disease. When in Switzerland as a teacher, aged 22, she felt very easily exhausted, had no appetite, suffered from indigestion, and often felt sick; she was told she was run down. At 25 she was again run down, had pain after eating, and felt sick; tired easily. Radiography of her stomach did not reveal any abnormality. At 28 she was again run down, this time with bad backache; her spine was radiographed at the time and found to be normal.

Family history.—Two sisters and one brother in good health. As far as could be ascertained there has never been any suggestion of familial illness. There is no consanguinity in the parents.

Progress.—She was examined on March 27. Temperature 103° F., pulse-rate 72, blood-pressure 140/85. The patient appeared very ill and toxic, there was cyanosis of the lips and pinkish jaundice of the skin. The pupils reacted to light and accommodation, the fundi and ocular movements were normal. The tongue was furred and moist. Lungs clear; heart not enlarged, sounds normal. Abdomen soft; spleen and liver were felt. Central nervous system normal. There had been insomnia, not relieved by Veganin or phenobarbitone gr. 2.

On the 28th patient felt much easier. Spleen and liver again palpable. Central nervous system: fundi clear, ocular movements and pupils normal, no nystagmus, plantar reflexes flexor, abdominals absent; ankle and knee, triceps, biceps and supinator jerks absent on both sides. No disturbance of sensibility, but severe muscular pain and deep muscular tenderness. No ataxia; motor power normal; no tremor. This day the peculiar dark brown colour of the urine was noticed, suggesting the passage of melanin or of methæmoglobin.

On the 29th she was much worse with severe headache and nausea. Temperature 103° F., pulse-rate 70; tongue dirty, moist, and furred. Neither spleen nor liver felt. Urine: dark brown; reaction acid, albumin +. No crystalline deposit. No bilirubin; uroporphyrin + + + (demonstrated spectroscopically). Later in the day the patient became restless and semi-stuporose and was only able to answer questions after some delay. Temperature 103° F., pulse-rate 88, respiration-rate 24. Still complained of sleeplessness. Much rigidity of neck, but neither Kernig's nor Brudzinski's sign present. Reflexes as on previous day. Constipated since the 25th in spite of several enemata. Great difficulty in micturition but no loss of sphincter control.

During the next two days she had pain, tenderness, and rigidity in the cervical spine. She vomited several times. Urine: dark brown. Urobilinogen (Ehrlich) +, urobilin —, uroporphyrin + +. No deposit. On April 1 the physical signs were unchanged, but in the evening the jerks of left upper limb were present. Lumbar puncture showed no abnormality. By the 3rd both knee-jerks were present, otherwise no change. Complained of headache and abdominal pain. Next day there was improvement. Knee, ankle, and upper limb jerks present, plantars flexor, abdominals still absent. Hardly any rigidity left in cervical spine. Liver and spleen not felt. On the 5th urine was lighter in colour, uroporphyrin still present, bilirubin + +, urobilinogen + + + (cold test). On the 6th there was slight loss of blood per vaginam. Urine: uroporphyrin negative, bilirubin + +, urobilinogen +, urobilin —.

By April 7 the urine was almost normal in colour; albumin —, urobilinogen —, bilirubin +, urobilin positive on spectroscopic examination and to Schlesinger's reagent. The pinkish jaundice was disappearing, especially on the abdomen and on the extensor sides of upper limbs. Petechiæ on both shins. Headache still present; transient diplopia. Abdominal reflexes still missing, all others present and normal. By the 8th the urine was normal in colour; bilirubin —, urobilinogen —, urobilin + +. She felt much easier and much stronger. Only traces of pink jaundice on

1. Rimington, C. *Proc. R. Soc. Med.* 1939, **32**, 1268.

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flexor side of upper limbs. No muscular tenderness. Diplopia had disappeared. She made a complete recovery, but all abdominal reflexes were absent till about April 18. From April 8 to 18 there were choreiform movements of the limbs.

Laboratory investigations.—Wassermann and Kahn tests in blood and C.S.F. gave negative reactions; agglutination for typhoid, paratyphoid A and B, and for *Brucella abortus* were negative in blood; radiogram of chest and heart, no abnormality seen; C.S.F., on April 1: cells, less than 2 per c.mm.; protein, 35 mg. per 100 c.cm.; globulin test, negative; chlorides, 720 mg. per 100 c.cm.; sugar, within normal limits; culture, sterile. No further examinations of blood or fæces were carried out.

Treatment.—M. & B. 693, 10 g., was given by mouth for 72 hours after porphyrinuria had been proved. The temperature quickly became normal, but neither the porphyry nor its clinical syndrome was influenced. The patient was also given Anahæmin, insulin, and glucose by subcutaneous injection and alkalis per rectum. But it is doubtful whether the result was due to this treatment, because spontaneous cures have been recorded. The insomnia was treated at first with phenobarbitone gr. 2 without any effect, but later the patient was given morphine gr. ¼ by hypodermic injection with success. After the acute stage had passed, she was given vitamin B_1 by mouth and by hypodermic injection, and hypodermic injections of strychnine hydrobromide gr. $\frac{1}{30}$.

DISCUSSION

There is no reason to believe that in this patient the porphyry was caused by any drug or toxin. No previous allergic or rheumatic illness was reported. Lastly, the porphyry could not have been due to food, because the porphyrinuria increased when she was almost stuporose and taking only fluids. She evidently had an acute attack of idiopathic porphyry; whether it was the first attack is not known, although it is likely that the previous attacks of "being run down," with indigestion and severe backache, were manifestations of the same illness. Porphyry is only one of the symptoms of the condition; other features of the attack in this patient were the association of the onset with the menstrual cycle, the obstinate constipation, backache, and the nervous symptoms, especially the acute peripheral polyneuritis which became apparent on the fourth day. The symptoms are not always typical; in any case showing acute abdominal pain, constipation, dysuria, vomiting, and signs of spastic ileus, with or without the presence of a dark brown or red urine, we must always think of acute idiopathic porphyry and try to establish its diagnosis by simple tests of the urine, of which the following are examples:—

(1) Examination of the colour of the urine, which may be deceptive. A normally coloured urine may contain porphyrin, and a dark urine may show bilirubin, melanin, hæmoglobin, or tyrosine and leucin crystals in the deposit. Or the fresh urine may be normal in colour and may show the peculiar dark brown or red colour only on standing. The change may be hastened by boiling the urine in acid solution. In the presence of porphyrin the urine will turn almost black, owing to the transformation of the chromogen to porphyrin.

(2) Aldehyde-reaction (Ehrlich's reagent for urobilinogen). If the test is negative, the presence of porphyrin is unlikely; if positive, examine for urobilin spectroscopically and chemically with Schlesinger's reagent. If urobilin is absent the presence of porphyrin can be presumed.

(3) Direct spectroscopy.

(4) Spectroscopy and examination of acetic-acid-ether extracts of the urine for red fluorescence under Wood's filter with ultraviolet rays.

(5) Waldenstroem's test (urochlor reaction). Add 2 c.cm. of concentrated hydrochloric acid to 1 c.cm. of urine; in the presence of porphyrin the urine will be purple. Now add one drop of a fresh 3% solution of hydrogen peroxide. In the presence of porphyrin the colour will change to yellow, after this slowly to a strong green, and then disappear. According to Waldenstroem, this test is as good and reliable as a spectroscopic test.

Other chemical tests and investigations for isolation and crystallisation of the porphyrins are of no interest to the clinician but are very important for the biochemist. Lastly, the clinician may sometimes be able to diagnose a case of porphyry from the rare but typical radiological appearances of the intestines, including complete atonia of one part of the gut associated with severe spasticity in another part; thus there may be dilatation of the stomach and duodenum accompanied by contraction of the jejunum and ileum and great dilatation of the colon.

The strong positive reaction to Ehrlich's aldehyde reagent was not due, in this case, to urobilinogen but to porphyrin or porphyrinogen. After the disappearance of the porphyrin from the urine the colour became normal, but the chemical tests showed for a few days considerable bilirubinuria and afterwards urobilinuria. This observation can only be explained as evidence of damage to the liver. Although, thanks to Fischer, the chemical structure of all porphyrins is known, their origin within the body is unexplained. Since porphyrins are found today after prolonged treatment with drugs of the sulphonamide group, it ought to be possible to throw more light on their origin.

SUMMARY

A case of acute idiopathic porphyry complicated by acute polyneuritis is described. The patient was treated with injections of liver extract, insulin, glucose, and alkalis, and recovered completely from the polyneuritis. The occurrence of the porphyries, their significance and diagnostic importance are discussed.

My thanks are due to Sir Maurice Cassidy and Dr. Gordon Holmes, who saw this patient in consultation with me and confirmed the diagnosis.

TREATMENT OF SPLENOMEGALY BY ASCOLI'S METHOD

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Ascoli[1] has claimed success in the treatment of splenomegaly in chronic malaria by intravenous injections of adrenaline. This has been confirmed by other workers, and claims have been made that it is efficacious in splenomegaly from other causes. Injections are given daily, starting with 0·01 mg., and increasing until a dose of 0·05 mg. is reached on the ninth day. This dosage is then continued for a further twenty days.

A series of 18 cases were treated, in all of which the spleen was enormous, extending down to or in some well below the umbilicus. Chronic malaria was the cause in 11 cases; they gave the usual history of frequent attacks of "fever" spread over a long period, and all showed considerable anæmia and debility; in only 4 cases were parasites found in the blood. Of the remaining 7 cases no cause for the splenomegaly could be found in 3, though it was thought not to be due to malaria; 3 were cases of kala azar and 1 of bilharzia.

The 11 malaria cases were given a ten-day course of quinine bisulphate, followed by a five-day course of Plasmoquine and an iron and arsenic mixture, with no effect on the size of the spleen and little on the general condition. They were then given Ascoli's treatment and during the time they were receiving this all other treatment was stopped. In 9 of them by the end of the course the spleen either was not palpable or could just be felt below the costal margin, and there was considerable improvement in their general condition and a gain in weight. Of the 9 who improved 2 did not complete the full course; one developed giddiness, breathlessness and precordial pain immediately after the nineteenth injection, and these symptoms increased in severity after each subsequent injection so that the course was stopped after the twenty-second; the other showed similar symptoms after the twenty-first injection, and treatment had to be stopped two days later. In 2 cases (one of which was complicated by mitral stenosis) the treatment was unsuccessful; there was little or no alteration in the size of the spleen, though there was slight improvement in the general condition.

The 3 cases in which no cause of splenomegaly could be discovered were given no preliminary treatment and none of them showed any decrease in the size of the spleen at the end of the course of adrenaline. The 3 cases

1. Ascoli, M. *Pr. méd.* 1937, **45**, 1827.

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of kala azar had all previously received a course of Neostibosan and of antimony tartrate or Anthiomaline, which had greatly improved their general condition but had not reduced the size of the spleen. In 2 of them adrenaline treatment made no difference, but in the third, who was given anthiomaline concurrently, a slight reduction was noted. The single case of *Bilharzia mansoni* infection had previously received antimony treatment which had cured his bilharzia but had not reduced the size of the spleen; his splenomegaly remained unaffected by adrenaline.

FISTULA OF THE PENILE URETHRA AFTER GUNSHOT WOUND

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Fistula of the penile urethra is notoriously difficult to cure, although this point is not emphasised in text-books. The accompanying figure depicts an example which came under my care in the year 1919.

CASE-RECORD

The patient was a not very robust young pensioner who had been discharged from the Army, the fistula being the sequel to a gunshot wound sustained three years before he came under my care. The opening into the urethra was situated just in front of the scrotum and would admit the end of a lead pencil; the margins were thickened and rolled, and the epithelia of the skin and the urethra were united. There was no stricture, but about half the urine escaped through the fistula during micturition. Four operations had been carried out—three of them under the guidance of Professor Rutherford Morison. Feeling that something more than ordinary repair must be attempted, I adopted the following procedure:—

A median incision was made along the under surface of the penis and round the fistula. The skin and the urethra were thoroughly separated. By using a skin flap cut from one side of the ellipse left round the fistula, using it as a lid turned back over the hole in the urethra, with the skin surface towards the lumen of the latter, and suturing it in position I was able to close the hole in the urethra without narrowing its lumen.

This interference, after the plan of Diffenbach, might alone have been sufficient; but, previous operations on these lines having been unsuccessful, I felt that I must reinforce the union to achieve success. The skin was therefore dissected up to the extent of about ½ in. all round the fistula, and the resulting bared area was covered with a free flap of fascia about 1½ in. long by ¾ in. broad cut from the outer side of the thigh. This was closely sutured over the repaired area of the urethra, and the skin was then carefully drawn together and sutured over the supporting fascia. Fine catgut was used for all sutures. At the same time a catheter drain was introduced into the bladder through a separate incision in the perineal urethra and was kept in situ for a fortnight.

The patient made a complete recovery. There was never any leakage from the urethra or suggestion of subsequent stricture, and seven months after the operation I passed a No. 10 rubber catheter without the slightest difficulty. I saw the patient from time to time, and seven years later the parts were perfectly normal, and there had been no trouble and no symptoms suggesting narrowing.

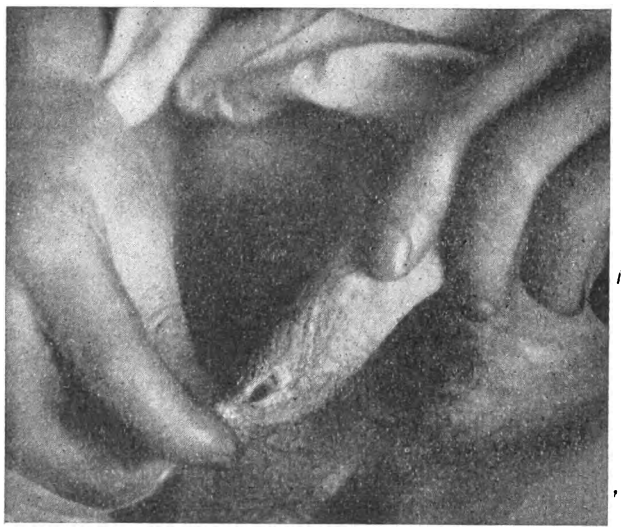
In dealing with the penile urethra I am sure that the diversion of the urine is an important step, but I also urge that the support of the fascial graft, as used in this case, was probably of considerable value.

COMMENTS

Urethral fistulæ resulting from gunshot wounds may be difficult to deal with, but their management must be conducted not as a special problem but in conformity with general surgical principles.[1] The crux of the problem is whether or not the whole urethra has been divided. When that has happened, the ends will have retracted, and the gap will be occupied by a mass of scar tissue, the fistula being situated just posteriorly.

There ought to be little difficulty in excising any moderate mass of scar tissue together with the fistula and getting the ends of the urethra together even with a gap of 1–1½ in. With the bigger gaps it will be necessary to mobilise the urethral ends, freely separating the corpus spongiosium (corpus cavernosium urethræ) from its bed. When the ends are brought together they should be approximated with only a few sutures of fine chromised catgut, which should take a good hold of the periurethral tissues without entering the lumen of the canal. In the perineal urethra only the roof and sides should be sutured, the floor being left open to ensure a bigger lumen. In the penile urethra—i.e., in front of the scrotum—sutures, should be placed all round the urethra, because the fistula tends to re-form.

The urine should always be diverted during the process of healing; a median perineal section is the best means of bringing this about. An indwelling catheter is certainly not ideal, because it encourages a mild inflammation of the mucosa near the urethral wound, and the resulting infection attacks the sutured area and leads to the formation of scar tissue. The perineal drain should be removed at the end of ten days, after which, the urethra being patent, the perineal wound and remains of the fistula may be expected to heal.



Fistula of penile urethra caused by gunshot wound.

Where large sections of the urethra have been destroyed, the question of the formation of a new tube by plastic methods or by the substitution of some other structure to form a urethra will arise.

When the continuity of the urethra has not been interrupted but there is a fistula to the surface, the problems that arise again depend on its situation. In the perineum it is probably enough to excise the skin margins of the fistula down to the urethra and to provide for diversion of the urine by proximal drainage. In the penile urethra it is traditional that difficulties arise, and at least one method of surmounting them has been detailed here.

1. Turner, G. G. *Lancet*, 1923, **2**, 82.

University of Sheffield. — The following external examiners have been appointed in the faculty of medicine: anatomy, Prof. R. D. Lockhart; physiology, Prof. R. J. S. McDowall; medicine and therapeutics, Prof. L. G. Parsons; surgery, Mr. E. Rock Carling; pharmacology, Prof. W. J. Dilling; obstetrics and gynæcology, Prof. A. L. Robinson; forensic medicine, Prof. Sydney Smith; public health, Dr. J. A. Charles; and dental subjects, Mr. J. P. Cocker, L.D.S.

The committee of management of the Sheffield Hospitals Council (Inc.) will include the junior pro-chancellor, the vice-chancellor, Prof. H. N. Green, M.D., Mr. Albert Harland and Prof. E. J. Wayne, F.R.C.P.

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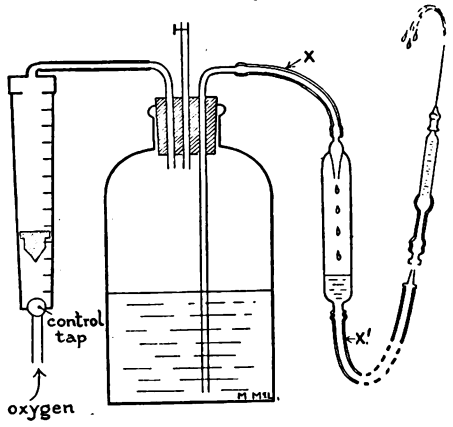
APPARATUS FOR GIVING INTRAVENOUS ANÆSTHETICS CONTINUOUSLY

BY R. R. MACINTOSH, D.M. Oxfd, D.A.; AND
E. A. PASK, M.B. Camb., D.A.
(*From the Department of Anæsthetics, University of Oxford*)

THE usual method of using a barbiturate as the sole anæsthetic for more or less prolonged anæsthesia is to give one or more additional mass injection whenever the patient appears to be overcoming the narcotic effect of the first. This procedure cannot be regarded as satisfactory, on account of the lack of constancy in the depth of anæsthesia. A more suitable method is to give a continuous drip injection of the narcotic solution, varying the rate of drip in accordance with the patient's condition and the depth of anæsthesia required.

With the intravenous-drip method of administering Pentothal the flow of the narcotic from its container to the vein may be maintained either by gravity or by increased air pressure within a closed container bottle. By the latter means the squeezing of a rubber hand bulb leading to the container usually supplies the air pressure necessary to force the solution out of the container into the vein. The hand bulb has to be compressed frequently, requiring almost continuous attention to the apparatus, and furthermore the pressure it creates cannot readily be maintained or varied to any controlled extent. The



following is a method which we have devised for replacing the hand bulb by oxygen under pressure from an ordinary cylinder of the gas.

A pressure-reducing valve and a control tap are essential; but the flowmeter illustrated is only a refinement. The oxygen is led into the top of the closed bottle containing the narcotic solution. From the bottom of the solution a glass tube leads through the cork of the container into a length of rubber tubing (X–X') interrupted by a glass dropper, through which the rate of drip of the solution may be observed; distally the rubber tubing ends in a male union. The needle fits on to a glass "window," the other end of which is attached to a short length of rubber tubing and a female union. After the tube X–X' has been filled with narcotic solution the needle is inserted into the vein. As soon as blood is seen in the window the male and female unions are connected and the needle strapped in position with adhesive plaster. The control tap is turned on, and the oxygen released from the cylinder forces the narcotic solution through the outlet tube into the sight dropper, and thence to the vein. The rate of flow is now subject to finger control. The middle tube leading into the container is fitted with a tap and can be used if necessary to dissipate any excess pressure.

The entry of a given amount of oxygen into the container bottle does not force out exactly the same amount of narcotic solution, since within the container the oxygen is compressed again to some extent, and slight leaks may occur. The variable flow of the solution through the Vacoliter sightdrip is a definite indication of the amount of anæsthetic being given at any time, and its control by the amount of oxygen released from the cylinder is a simple method of maintaining a constant level of anæsthesia, or of deepening it. If a precise measure of the amount of narcotic solution that has entered the vein is required the container bottle may be calibrated in c.cm., and the lowering of the solution level noted from time to time.

Although this method simplifies control of the rate of injection of any fluid it is obviously necessary to prevent the container-bottle becoming empty while the needle is still in the vein, since in that event a dangerously large amount of oxygen may easily be forced rapidly into the vein, causing a gas embolus.

ACUTE FATAL HYPERPARATHYROIDISM

BY F. B. SMITH, M.D. Camb.
PATHOLOGIST TO THE ROYAL INFIRMARY, PRESTON; AND
R. T. COOKE, M.D. Edin.
ASSISTANT PATHOLOGIST TO THE INFIRMARY

RECORDS of acute poisoning by parathyroid hormone in man are few. The following case is apparently the fifth to be confirmed by necropsy. The reaction is known in experimental animals, death occurring in a few days with tissue necrosis and diffuse calcinosis. Oliver (1939) described two cases (women, aged 57 and 56 years), and reviewed the three previously recorded—by Dawson and Struthers in 1923 (a man of 49), Lowenburg and Ginsburg in 1932 (a boy of 5), and Hanes in 1939 (a woman of 49). The second of these three cases was the only one to recover; in this boy the excess of extract was not produced by an overacting endocrine gland, but had been given therapeutically in mistaken dosage.

CASE-RECORD

A woman, aged 44, was admitted to Preston Royal Infirmary on Aug. 8, 1939. She had been married 17 years; her only child, born a year later, died of bronchopneumonia at 13 months. Her health had been good until 1937, when she had attacks of rheumatism in one hand, and dizziness. A limp developed, and the thighs became slightly bowed. Pain in the legs became severe and was unrelieved by treatment. There was some constipation. In July, 1939, she was in bed with rheumatism. The sequence of events leading to the fatal crisis can best be seen in the following diary.

Progress.—Aug. 8, 1939. Admitted 11.30 P.M. with history of abdominal pain, vomiting and constipation, but slept comfortably until morning. Enemata were effective next day, and for the next six days and nights the patient, although constipated, was comfortable and without complaint. A catheter specimen of urine was acid, specific gravity 1012, and contained a little albumin, with a few erythrocytes and leucocytes in the spun deposit.

17th. Radiograms of gastro-intestinal tract showed no abnormality.

18–20th. Some frequency of micturition.

21st. Mild attack of abdominal pain and vomiting, which passed on the bowels being moved, but left some tenderness.

22nd. Drowsiness; incontinence of urine and fæces.

23rd. Cerebrospinal fluid normal as regards appearance, cell-count, globulin, protein and chloride content, gold curve and Wassermann reaction. Delirious at night, pulse-rate 132, respirations 64 per min.

24th. Conscious but critically ill. Nausea, dry skin, furred tongue, distended tender abdomen. 10.30 A.M. blood taken for count (normal) and chemistry (sugar 85 mg. per 100 c.cm., urea 155 mg., and calcium 23 mg.). Death at 2·5 P.M.

Necropsy.—An hour and a half after death. Slim woman with moderate outward bowing of thighs; skull purple and soft, but of normal size. Thyroid gland normal; at lower pole of right lobe and behind right sterno-clavicular joint is a firm, smooth, encapsuled, ovoid yellow tumour of parathyroid gland, 25 × 20 × 20 mm. in size and weighing 7 g.; cut surface homogeneous except for a few minute areas of colloid.

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Old adhesions over upper lobe of each lung; lower lobe of right lung (400 g.) congested; left lung 280 g. Heart small (250 g.) with dilated right side; coronary arteries healthy. Scattered flecks of necrosis of subperitoneal fat near stomach and pancreas, which latter is swollen, and, in its right half, grey and necrotic; weight 200 g. Kidneys, left 240 g., right 300 g. Very swollen, with deeply congested, hæmorrhagic cut surface; capsules strip readily. Parts of right iliac bone sampled and found soft; one small cystic area exposed. Right femur excised and split; thin ring of shaft; extension and hyperæmia of medulla; one medullary "cyst." Other organs normal to naked eye. Radiological examination of removed kidneys showed no macroscopic deposits of calcium.

Histology.—Sections in paraffin were made from parathyroid tumour, heart, lung, liver, spleen, adrenal gland, kidneys, pancreas, uterus, stomach, ileum, colon, pituitary gland, parietal bone, iliac bone and femur, and stained by hæmalum and eosin and with van Gieson's stain. The parathyroid tumour is an adenoma of chief cells. The parietal bone shows osteoporosis and osteitis fibrosa. The iliac bone and femur show osteitis fibrosa cystica. The kidneys show very abnormal features: early thrombosis in some of the veins of the pelvis, and at the junction of cortex and medulla; thrombosis of a few smaller arterioles and capillaries, the walls of some of which show early necrosis; intense general engorgement and a few interstitial hæmorrhages; focal cloudy swelling and necrosis of tubular epithelium; in the lumina of tubules are cellular remnants, albuminous casts, erythrocytes and a few polynuclear cells; distension and loculation of glomerular spaces with exudate; adhesion of tufts to capsule; hyaline degeneration, shrinkage and atrophy of tufts. Widespread calcinosis, mainly in tubular epithelium and basement membranes, much in interstices, a little in some glomerular tufts and the walls of a few small arterioles and capillaries. Evidence of chronic renal damage is absent. Pancreas shows early venous thrombosis, block necrosis of gland and interstices, with finely divided and widespread calcinosis; slight inflammatory reaction of lymphocytes and polynuclear cells. Sections of other viscera are normal.

DISCUSSION

We suggest that death was due to an acute crisis supervening upon chronic hyperparathyroidism. The state of the kidneys is that classified by Allbright and his collaborators (1934) as type 3 of the effects of parathormone, an acute effect, the case "making a rapid exit—chemical death as it were—without chronic lesions in the kidneys." This renal state is also described by Chown et al. (1939) in acute parathormone poisoning of rats, after as little as 48 hours, and also by Duguid (1933–34) in the acute phase of phosphate "nephritis" in rats. Duguid found that, if acid phosphates alone were given in excess or continuously, without excess of vitamin D, in contrast to alkaline phosphates, they produced this necrotic type of tubular "nephritis," as an early stage of fibrotic and vascular "nephritis." Reference to the previous reports shows the similarity of the critical symptoms in them and in the present case. In this one, however, the illness was apyrexial throughout; the kidneys and pancreas bore the brunt of the necrosis and calcinosis; and the vascular thrombosis in these organs is a striking feature. The pancreatic lesions probably explain the abdominal pain, and raise the possibility of confusion with acute hæmorrhagic pancreatitis.

SUMMARY

A woman, aged 44, with chronic hyperparathyroidism and osteitis fibrosa, died in the second of two crises of acute hyperparathyroidism, with acute necrosis and calcinosis in kidneys and pancreas.

Our thanks are expressed to Mr. A. Toulmin and Dr. W. A. Simpson for access to the patient and case-notes, and to Mr. R. Spivey for his interest and skill in histology.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

SECTION OF ODONTOLOGY

AT a meeting of this section on Oct. 28 Mr. EVELYN SPRAWSON gave his presidential address on some

Forensic Aspects of the Teeth and Jaws

Several years ago, he said, he had set a question in a dental surgery paper which no candidate attempted; it asked what deductions might be made concerning the age, habits and life-history of the individual from the study of the teeth and jaws. In examining the evidence on which a reply might have been based, he pointed out that age may be assessed with relative accuracy, chiefly from the teeth and to a less extent from the jaws. The dates of calcification, eruption and absorption of deciduous teeth are useful: the first permanent molar may erupt between 4½ and 7½ years. Isolated deciduous teeth, especially molars, may be unreliable evidence of age; occasionally they have no permanent successors, and though, in that case, their roofs usually become absorbed, such absorption is delayed and may not occur at all. Rate of wear will also vary according to the physical characters of food and functional activity, this latter depending in turn upon such factors as general health and the degree of occlusal perfection and the health of the individual. Deciduous teeth show wear more readily than do permanent teeth. Disease may accelerate or delay the eruption of teeth and occasionally one or more deciduous teeth may be erupted at birth. As to the jaws, the degree of growth, closure of sutures, the mandibular angle and causes affecting it, and finally the presence or absence of tooth sockets or crypts all may afford evidence of age. Radiographic examination is essential. Disease in childhood may sometimes give useful evidence. The green teeth of icterus gravis neonatorum and the pink teeth of congenital hæmatoporphyrinuria are examples. The former must not be confused with teeth stained green from lack of care of the mouth; here the stain is superficial and its distribution different. The pink teeth of hæmatoporphyrinuria must be distinguished from those discoloured by blood extravasation from the tooth pulps in death by strangulation; this extravasation depends in turn on dentinal tubule patency, itself governed by age and attrition. Hypoplasia of the deciduous teeth is evidence of deficiency in the maternal diet; and of the permanent teeth, if transverse and linear, indicates acute short illness at the time of calcification. The trophic hypoplasia of malnutrition, probably rachitic, of canines, incisors and first molars is less common now than formerly, but it must be distinguished both from hereditary hypoplasia (said to exempt third molars) and from that due to local trauma and suppuration. Congenital syphilitic stigmata, though not always present, are pathognomonic when found; evidence that the deciduous teeth may be so affected is unsatisfactory. Caries of the incisal edges of the anterior teeth has several times been recorded as syphilitic in origin, but it is generally believed that if the infecting agent is active when this part of these teeth is calcifying the pregnancy usually aborts.

Bones do not tell us much; necrosis during the acute stage of scarlet fever or measles may result in the loss of tooth germs in the sequestrum, but absence from other causes is too common to make this evidence of much value. Clefts, and the dental abnormalities associated with them, and the spacing of teeth may give evidence of identity. The breast-fed child has wide jaws and a flattened palate. About the age of 6 the anterior teeth are well spaced and no longer in lateral contact; ultimately there is more room for the permanent teeth. Heredity does not tell us much; hereditary hypoplasia is rare; congenital absence or excess of teeth may be difficult to prove though X-ray evidence before the normal date of eruption of a tooth may show that it is absent from the jaw. Hereditary variations of the bones and jaws are not common and may be masked by orthodontic treatment. The size of the teeth is not helpful; with one exception all cases of exceptionally large teeth he had seen in British mouths had been in males, though

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there are racial differences in the size of teeth, of course, and the measurements of teeth of the micro-, meso-, and megadont races run almost parallel to those of the gnathic index.

In a few cases evidence of habits and occupation may be present, as in the special attrition of maxillary incisors in boot lasters, and abrasion in clay-pipe smokers—both of which marks indicate sex in this country at least; similarly the small jagged notches in maxillary incisors caused by biting cotton thread are usually a sex mark. Erosion cavities tell us that the patient takes some care of his teeth, that he scrubs too hard or uses too stiff a brush or too abrasive a dentifrice or brushes the wrong way. The position of the teeth most abraded indicates whether the individual is right- or left-handed. The rampant caries of the baker or confectioner is of value, though rampant caries is apt to occur in others; he had once, he said, seen a professional chocolate taster who had cervical caries on every tooth in an otherwise almost complete dentition. Similar caries has been noted in young employees in sulphuric and tartaric acid chemical factories. The smoker's salivary calculus will be stained dark brown, especially on the lingual side of the mandibular incisor teeth, and the strong tea drinker will often have black stained dentures. These two items also to some extent indicate sex. The blue line of Grisolle along the gum margins, caused by chronic lead poisoning, depends on the presence of teeth and on some degree of gingival infection; it must not be confused with the browner line produced by the bismuth of antisyphilitic treatment, nor with subgingival calculus, nor with carbon deposit. Tribal marks in primitive races are sometimes made by filing away parts of maxillary incisors; the wide arches of Eskimos afford some indication of sex, being greater in the ladies whose duty it is to render pliable the sealskins for clothing by chewing them. Caries generally preponderates in civilised races and its conservative treatment should indicate a higher degree of civilisation. Absence of caries in early life may indicate a good diet rather than conservative care; rampant caries indicates the absence of both. In the young, gingivitis is an indication of mouth-breathing, caused by nasal obstruction, and the habit and its results may remain permanently even after nasal patency has been established. General gingivitis, and its frequent sequel of parodontal disease, may indicate the character of the diet and the amount of care taken of the teeth and so perhaps be some guide to social status. The character of conservative work at present also indicates social status and perhaps nationality. He admitted professional shame at the travesty of dentistry at present provided for civilian war casualties. Old fractures leave scars and the same applies to loss of tissue from teeth, whether from trauma, attrition or caries. A man's teeth are as individual as his finger-prints, though less permanent; but when present they may tell more of his life-history. Evidence of the kind discussed has established identity in Australia, the United States and, he believed, in this country.

Reviews of Books

Sulfanilamide, Sulfapyridine and Allied Compounds in Infections

By MAURICE A. SCHNITKER, M.D., attending physician, Toledo Hospital. London: Humphrey Milford, Oxford University Press. Pp. 72. 8s. 6d.

REPRINTED from the Oxford Loose Leaf Medicine, this little book fairly summarises the American outlook on present-day chemotherapy. The chapter on the sulphanilamides is the best, though the description of 8-hourly intrathecal injections for meningitis would have been better omitted; that on sulphapyridine contains many errors, and there is no mention of sulphathiazole. The extensive bibliography of 202 names is not of great use to British physicians since most of the references will be unobtainable here; only 33 are British. The original clinical work on sulphapyridine and the treatment of methæmoglobinæmia by methylene blue, both published in THE LANCET, are two notable omissions in an otherwise full bibliography. Details of pharmacology and biochemical assay are unnecessarily full in a book intended "to assist physicians in their daily problems" In his final paragraph the author states that "the greatest care must be exercised in the use of all these drugs and treatment must be controlled by frequent determinations of blood and urine sulphanilamide content and their use must therefore be in the hands of those who have facilities for such determinations." If this were true, then the details of assay described might be justified, but the practice of chemotherapy would be very limited.

Infant Feeding

By ALAN MONCRIEFF, M.D. Lond., F.R.C.P., physician to the children's department at the Middlesex Hospital, and to outpatients at the Hospital for Sick Children, Great Ormond Street. London: Edward Arnold and Co. Pp. 31. 1s. 6d.

THIS little brochure deals with the management of the feeding of infants from birth up till three years, a subject difficult both to teach and to practise. Dr. Moncrieff has had much experience of the problem both as a teacher and a practiser, and in giving his instructions his aim is to reduce the problem to its simplest terms and present it in the fewest words. The trouble is that while we know a great deal about the chemistry of human and cow's milks we do not know nearly enough about the physiological processes of its digestion by the baby, or about the numerous disturbances of digestion that occur. Meantime clinical experience is the main guide to success in practice; and Dr. Moncrieff sets out to give the sound nursery lore on the subject, based on a few fundamental principles. In the opening pages he makes a short and simple statement of these principles, and he then proceeds to apply them to the management of breast-feeding, cow's-milk feeding (liquid, condensed and dried), complementary, supplementary and mixed feeding, and the special feeding of the premature baby. All this is done with the minimum of chemical terms and without mentioning the word calories. Certain risks go with this method of condensation—over-simplification, and the omission of practical difficulties—and the section on breast-feeding might have been enlarged with advantage. But if this carefully written book is as carefully studied the pupil nurse or the medical student will be fitted to begin the practice of infant feeding. If difficulties arise they will have to use their self-reliance and common sense as they are again and again urged to do in these pages.

Illustrative Electrocardiography

(2nd ed.) By J. BURSTEIN, A.B., M.D., associate electrocardiographer and chief of the cardiac clinic, Morrisania City Hospital, New York. London: D. Appleton-Century Co. Pp. 292. 25s.

INFORMATION derived from the use of chest leads has given fresh impetus to the study of electrocardiography. The second edition of Dr. Burstein's manual includes a chapter on these leads in which the changes of chief clinical value are summarised, especially those of cardiac infarction. Unfortunately the large number of chest leads which have been used complicates this new aspect of cardiography and further observations are needed to define more precisely the value of the different leads. For the present those new to the subject should content themselves with studying the one recommended for routine use, that is the apical lead. In other sections of the book the normal cardiogram and the commoner abnormalities are illustrated by curves from the ordinary limb leads. The simple style of writing and the limitation of the text to explanation of the illustrations make the book well adapted to the needs of beginners, but it is sufficiently comprehensive to be of use also to the advanced student.

Dr. Ninian Falkiner has been elected master of the Rotunda Hospital in succession to Dr. A. H. Davidson, whose term of office had expired. Dr. Falkiner is a graduate of the University of Dublin, and a fellow of the Royal College of Physicians of Ireland and of the Royal College of Obstetricians and Gynæcologists; he has been for several years gynæcologist to the Royal City of Dublin Hospital. A number of the governors have presented to the hospital a portrait of Dr. Davidson, painted by Mr. D. O'Brien, P.R.H.A.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 23, 1940

FACING DISABILITY

A PERIPATETIC correspondent has raised an arguable point. A girl shorthand-typist, whose back was broken in a motor accident, received appropriate treatment in the course of which she was seen by two orthopædic surgeons. A laminectomy was performed but failed to relieve the pressure; and both surgeons formed the opinion that the patient would never walk again. On hearing their verdict she called in an osteopath, and is said now to believe that complete cure is at least possible. Our correspondent feels that it is wrong and harmful that the patient should be buoyed up with hopes which are doomed to ultimate disappointment, and he regrets that she should prefer the opinion of an osteopath to that of two orthopædic surgeons. There is no clear evidence that the osteopath implanted the false but comforting hope, and the fact that the patient sought the aid of osteopathy should not be allowed to confuse judgment. The issue is this: in what circumstances is a medical man justified in forcing a patient to face unpleasant facts? Clearly if a patient can derive no possible benefit from facing them there is no justification for thrusting them upon him. Nothing, for example, is gained by depressing the moribund; and it is legitimate to practise a benevolent deception if only because no-one can accurately measure or foresee the action and interaction of the many body fluids which are powerfully affected by the mental attitude. To ignore them is to neglect a possible ally; and to dishearten a patient by a gloomy prognosis (founded at best on knowledge which is incomplete and may even be misleading) is to rob him of a valuable defensive weapon. KINGSTON FOWLER, referring to tuberculosis, once said that the only certainty in making a prognosis was that it would inevitably prove to be wrong. The statement is less of an exaggeration than it ought to be, and applies beyond the limits of tuberculosis.

Our correspondent is willing that the moribund should be spared unpleasant facts, but believes that in the case of this girl the position is different. "So long as she looks forward to walking again," he writes, "she will never face life as a cripple." The truth is that she will never face life as a cripple until she has exhausted every hope of escape. She quite naturally resists the fact that she is permanently disabled. Only when she has faced this fact, says our correspondent, will she begin to re-plan her life. But how can she re-plan it? What can she do? He claims that "if she would face being carried in she might be able to do her shorthand and typing from a wheeled chair." But who will lift that chair into trains and buses so that she may reach her work? Who will open and shut doors for her at her office? Who, in short, will bother with her when there are plenty of other shorthand typists whose backs have not been broken? Permanent disablement usually means, for an earner, a lifetime of physical and economic dependence. Before insisting that she shall face that fact it seems only fair that most of us should face another. There is no provision for such cases as this, and the remaining faculties of this girl—and the hundreds of thousands like her—are wasted, simply for lack of an environment in which they could be used. We have evolved a great and in many respects admirable public-health machine, but it has defects; and probably the most serious is complete failure to recognise that the restoration of working capacity is useless in the absence of the opportunity to earn. A large measure of this girl's working capacity has been or can be restored, but what then? "She could do her shorthand and typing from a wheeled chair." Advice such as this is unpractical. The employer usually will not, cannot, bother with the disabled; they slow things up and they are not wanted. If we are foolish enough to continue to waste the working capacity of our innumerable disabled—whose numbers increase with every air-raid, with every accident in mine and factory—those who remain fit will have an almost insupportable burden to carry.

The remedy is real rehabilitation—the association of restored working capacity with the opportunity to earn. This is achieved at the village settlements of Papworth and Enham, which constitute probably the largest rehabilitation unit in this or any other country. A national rehabilitation board, on the lines already indicated in these columns,[1] could find means to avoid waste of the talents of the disabled by extending the village-settlement principle. Until we can offer such patients a reasonable hope of employment in an environment which will reduce their physical handicap to a minimum and increase their earning power to a maximum our curative work will be robbed of more than half its value. The achievements of Papworth and Enham, of Dame Agnes Hunt at Gobowen, and of other workers elsewhere, have demonstrated that comprehensive, large-scale rehabilitation is an essential part of modern medicine. Before we expect patients to face unpleasant facts we should ensure that they have the opportunity to re-plan their lives afterwards.

SUGAR

"Suck, Baby, suck, your Father says it's sugar!" is the legend of a cartoon[2] depicting Napoleon's infant son hopefully gnawing the end of a large sugar-beet. The sardonic exclamation is made by the child's nurse well within earshot of the great general; but Napoleon, impervious to the gibe, is sitting at a small table squeezing the juice of a sugar-beet into his tea. Napoleon set many unfortunate precedents, but he must be given credit for his pioneer work on behalf of the beet industry. His vision of a new order in Europe included the preliminary isolation of England and her dependencies by the formation of a self-sufficient continental block. By his embargo on British merchandise he automatically cut off his chief supplies of sugar, hence the revival of interest in the sugar content of *Beta vulgaris*, the sweet properties of which had been noted as early as 1590 by Olivier de Serres. After Waterloo the continent was again flooded with cheap cane-sugar, and interest in beet-sugar naturally wilted. Since 1815 the state of health of a continent subject to a manic-depressive psychosis has been accurately mirrored by the sugar-

1. *Lancet*, 1940, 1, 131.
2. Sugar. By Geoffrey Fairrie. Liverpool. 1925.

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beet industry. Activity in the trade, especially if it is enjoying government subsidies, portends a maniacal exacerbation somewhere.

Intensive beet cultivation by the Germans has resulted in an annual output of only 2 tons of raw sugar per acre. Sugar-canes yield an average of 6 tons per acre, and as much as 15 tons has been produced. From the consumer's point of view, however, there is nothing to choose between the two products—first-grade refined beet-sugar is indistinguishable from cane-sugar similarly treated. The sulphitation bleaching process which is commonly used on the Continent is inferior to the methods of refining by means of animal charcoal, and this is probably the explanation of the belief that beet-sugar is less sweet than cane-sugar. The relative impurity of bleached sugar is indicated by the fact that it is unsuitable for making lump sugar. The sucrose content of cane-sugar and of beet-sugar, even in the "raw" state, is remarkably high—96% and 95%. In the process of refining a purity of 99·9% is attained, thus making sugar perhaps the purest of all foodstuffs in commerce. Even soft brown sugar contains as much as 96% of sucrose and a further 2% of uncrystallisable sugars. It is unlikely, therefore, that sugars of this quality will ever become the subject of heated controversies such as have raged over the different varieties of flour.

The process of producing sugar from its mother liquors is essentially one of crystallisation from supersaturated solutions. The last residue or final molasses yields a number of side-products of extraordinary variety, but prior to this it may be treated to give dark-coloured syrup known to the trade as "treacle," but not to be confused with black treacle. Golden syrup has a superior pedigree to either of these; it originates in the process of fractional crystallisation of the syrup of the original canes. Golden syrup contains nearly 80% of sugar compared with about 60% in treacle, but whereas in golden syrup the proportion of sucrose to uncrystallised sugars is 1 to 1·6, in treacle it is 3 to 1. Castor sugar and icing sugar are prepared from first-grade crystal or granulated sugar by passing it between grinding rollers.

The liquid glucose used by bakers and manufacturers of sweets, jellies and jams contains approximately 35% dextrose and 45% dextrin; solid glucose also used in baking and brewing contains about 75% dextrose and rather less than 10% dextrin. The pure dextrose used by the doctor for parenteral injection has a purity on a dry basis of 99·9%. Confectioners distinguish between "hard-grain" and "soft-grain" sugars. A sugar is soft-grained if it does not stand up to heat in the oven—for example, if when used in the form of "nibs" on buns it melts and runs down the bun before it is ready to be taken from the oven. Bakers generally consider that they get less soft-grain sugars from cane than from beet. They regard hard-grain sugar as the more satisfactory from the point of view of working, solubility and sweetness.

Sugar is a food, but when we buy it we expect value in terms of sweetness. The absolute measurement of sweetness is at present impossible, for the variables are many and uncontrollable, but the relative sweetness of pure sugars was determined with considerable accuracy in 1925 by workers in the University of Minnesota.[3] If the sweetness of sucrose is taken as 100 the figures for other well-known sugars are: lævulose, 173; dextrose, 74; maltose 32; galactose 32; lactose 16. The degree of sweetness of a sugar is, however, affected by the foods with which it is taken. Thus a dilute solution of sugar ceases to taste sweet in the presence of a small quantity of common salt. Mucilaginous foods, and fats such as cream, also diminish the sensitiveness of the taste buds for sweet-tasting substances, and the sweetness of jams and honey is modified by the presence of essential oils and other aromatic compounds derived from fruit and nuts.

PORPHYRINURIA

THE Greeks knew a certain coloured shellfish by the name πορφύρα, and their πορφύρεος λίθος was an Egyptian igneous rock in which red and white crystals are embedded in a fine red ground-mass. From πορφύρεος we derive, through the Latin purpureus, our "purple"; and we retain the word porphyry to designate a number of purple or other coloured rocks of the same crystal-and-matrix structure. In 1865 the name "porphyrin" was given by a German chemist HESSE,[4] to one of two pigments which he isolated from the bitter-tasting infusion of an Australian bark. Since then porphyrins have been found widely distributed in nature. The African plantain-eater (turacus) owes its bright red wing-colour to the copper compound of a porphyrin; porphyrins are obtainable from grass, malt, yeast, and some worms; certain bacteria synthesise them; and they are an important constituent of chlorophyll, cytochrome, catalase and hæmoglobin. Hæmoglobin consists of globin united with hæmatin; removal of iron from hæmatin, with little other alteration, yields protoporphyrin. The basis of this, as of all the porphyrins, is a somewhat complex but very stable ring structure in which four pyrrole nuclei are linked together through four intervening carbon atoms; another German chemist, HANS FISCHER, called it porphin, and synthesised it in 1929. A minute quantity of porphyrin is found in normal urine and at first sight this might be expected to originate simply from breaking down hæmoglobin. The chemists, however, will not allow this; they divide all the naturally occurring porphyrins into two series, I and III, according to the pattern in which certain ethyl and methyl groups are attached to the fundamental porphin ring (there are two other series, II and IV, of unnaturally occurring porphyrins). Series I porphyrins cannot be converted in vivo into series III compounds or vice versa, short of rupture and resynthesis of the ring. Hæmoglobin contains a series III porphyrin, but half of the normal trace of porphyrin in the urine is of series I; therefore it at least cannot be derived from the breakdown of hæmoglobin, and is more probably a by-product of the process by which hæmoglobin is built up in the body. The other half of the normal urinary porphyrin is of series III, and so could derive from hæmoglobin, although it is clear that the bulk of the hæmoglobin in its disintegration follows a totally different chemical path, beginning with rupture of its porphin ring and ending in bilirubin. There is still much to be learned about the

3. *Amer. J. Physiol.* 1925, **73**, 387 and 397; see *J. Amer. med. Ass.* 1925, **2**, 977.
4. *Annalen der Chemie und Pharmacie*, 1865–6, Suppl. 4, p. 40.

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chemistry of hæmoglobin formation and destruction in the body.

Derangements of these processes are characterised by the appearance of abnormal amounts of porphyrin in the urine, usually enough to give it a brown, red or portwine colour when passed, or after standing for some hours. Delicate spectroscopic examination is needed to identify the pigment. Porphyrinuria may be classified clinically under three headings. There is, first, porphyrinuria due to drugs, such as sulphonal, trional, amidopyrin, phenacetin, phenazone and the whole sulphanilamide series. It occurs significantly only when they are given in toxic doses, or to sensitive subjects, and the porphyrinuria runs parallel with methæmoglobin production in the blood.[5] The porphyrin found is mostly of series III, though FISCHER reported it as of series I; it is therefore probably derived from hæmoglobin, via methæmoglobin. Along with the porphyrin excretion there are sometimes dramatic symptoms similar to those of the second clinical group, which is called idiopathic porphyrinuria. It is an example of this condition, hitherto rarely reported in this country but long known in Germany and not uncommon in Sweden,[6] that Dr. LEO RAU describes on another page. It usually presents itself as an acute abdominal colic suggesting intestinal obstruction; the patient vomits repeatedly and is constipated till the attack is over, when he may pass fæces in small hard fragments accompanied by blood-stained mucus. The abdomen may or may not become distended, and there is often a little fever. It is not surprising that this picture often leads to laparotomy; no organic lesion is found, but constrictions and anæmic areas in the upper jejunum, with dilatation above and contraction of the gut below, have been described and have suggested local vascular spasm as the mechanism. In this, as in its other features, the attack closely resembles lead colic, but its hall-mark is the appearance of a red or brown colour in the urine due to porphyrin (often accompanied by another red pigment, as yet unidentified). The symptoms may continue for days or even weeks, but they more often subside in a shorter time. Attacks recur at long or short intervals, sometimes in women in association with menstruation. A wide variety of neurological symptoms, some suggesting encephalitis and others peripheral neuritis, have been described as occurring with the attacks of colic, but the basis and pattern of these are as yet ill-defined. The porphyrin excreted is of the series III, and could therefore be derived from hæmoglobin, but evidence of hæmolysis is lacking and there is no record of methæmoglobinæmia; so it presumably results from a more intimate disturbance of pigment metabolism. There is little to suggest that the porphyrin itself is responsible for the symptoms; its excretion seems merely to accompany them. The third clinical variety of porphyrinuria is almost entirely different from the first two. It was studied in this country by Sir ARCHIBALD GARROD, who called it congenital hæmatoporphyrinuria. It is an "inborn error of metabolism," inherited as a Mendelian recessive. Those who suffer from it excrete considerable amounts of a series I porphyrin from infancy onwards. Their skins become acutely sensitive to light and unless protected show recurrent hydroa æstivale. Their teeth and bones are stained red. The condition is also seen in cattle.

The study of these rare conditions may lead the biochemist to an understanding of the metabolism of hæmoglobin and the respiratory pigments of the cell. The clinician's chief concern is with the recognition of acute porphyrinuria, idiopathic or due to drugs; if he makes the diagnosis he can save his patient from an unnecessary operation, though unfortunately he can offer no effective treatment, and he must expect a mortality of about 50%. Simple tests which he may perform upon the urine are described by CHANDLER, HARRISON and RIMINGTON,[7] who recorded a fatal case of acute idiopathic porphyrinuria last year and gave a summary of the chemistry of the porphyrins. They chose the term "clinical porphyrinuria" to cover the three clinical groups. This does no more than label the disease by one of its signs, but it is more explicit than the non-committal term "porphyry," a name already borne by a mineral beloved of the poets and by a third-century philosopher.

5. Brownlee, G. *Proc. R. Soc. Med.* 1939, **32**, 1276.
6. Waldenström, J. *Acta med. scand.* 1937, Suppl. 82, p. 1.

BURNS OF THE HANDS AND FACE

LAST week we reported a meeting of the Royal Society of Medicine at which all speakers agreed that tannic acid should no longer be used as an application for burns of the face, hands or feet. The tanning of the tissues, desirable in the treatment of burns of other parts, causes dangerous compression of the blood-vessels to the fingers and toes, and by stiffening the eyelids may lead to exposure of the cornea. We have received anxious inquiries from A.R.P. workers as to what should be applied to burns on the hands and face. It is understood that the Navy and R.A.F. propose to issue for the purpose collapsible tubes of a jelly containing 1% of gentian violet and 0·02% of Merthiolate. There are, however, objections to gentian violet for general use. It is not easily obtainable and it does form a coagulum, though a softer one than tannic acid. In E.M.S. hospitals the application recommended is tulle gras; this consists of curtain net with a 2 mm. mesh soaked in soft paraffin 98 parts, halibut oil 1 part and balsam of Peru 1 part[8]; it can be kept in tin boxes and applied directly to the burn. Saline packs can be applied outside it and the saline will penetrate the mesh. For first-aid antiseptics should be avoided, and certainly no antiseptic should be used near the eyes. First-aid parties dealing with a burn of the face, hands or feet will be best advised to apply either tulle gras or plain sterile dressings, so that the hospital surgeon will be able to make an unhampered diagnosis when he sees the case for the first time. There is no objection to the use of tannic acid elsewhere on the body. A committee is now considering the first-aid treatment of burns, and is to announce its proposals shortly.

Dr. LETITIA FAIRFIELD has been appointed to the Royal Army Medical Corps with the relative rank of lieutenant-colonel as woman medical adviser to the War Office and member of the Auxiliary Territorial Service Council. In the last war Dr. Fairfield was woman medical director of the R.A.F. medical service.

The fifth list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £9800.

7. Chandler, F. G., Harrison, G. A. and Rimington, C. *Brit. med. J.* 1939, **2**, 1173.
8. Tulle Gras (Lumière), Anglo French Drug Co.; Nonad Tulle, Allen and Hanburys.

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Annotations

DELAYED PRIMARY SUTURE

THE ideal treatment of a war-wound is immediate excision and suture, but this may be dangerous if applied to badly contaminated wounds with much laceration and crushing of the tissues, especially if there has been delay in starting treatment. In many cases it is necessary to leave the wound unsutured, and this is an essential part of the closed plaster technique. The advantages of this method are undoubtedly great—the free drainage is an important safety factor; the close-fitting plaster promotes the healing of all tissues by immobilising and supporting them and prevents subsequent reinfection of the wound from without, which may be more serious than contamination at the time of infliction; patients are spared the pain and nurses the labour of frequent dressings; and transport is greatly facilitated. On the other hand, an open wound may take weeks and even months to heal by granulation and the long immobilisation will certainly lead to considerable stiffness; the diagnosis of complications in a covered wound is difficult; the application of the plasters is time-consuming even when done by experts; and no effective remedy has yet been devised for the noisome stench.

If immediate primary suture is ideal but dangerous, healing by granulation even under a plaster is a poor second best. Is there no compromise? An answer may be found in delayed primary suture, which has many of the advantages of immediate suture without its danger, and which avoids the snags of Trueta's method. Delayed primary suture is not new—it became popular at the end of the last war. Fraser and others [1] found that 60·8% of wounds of the limbs admitted to a C.C.S. were suitable for closure and of these approximately half were treated by delayed primary suture. After a culture had been taken the wound was carefully excised, treated with an antiseptic such as flavine, and lightly packed with gauze. Sometimes the sutures were placed at this operation. Two to four days later the wound was closed, provided that it appeared clean and healthy, that the patient's general condition was satisfactory and that hæmolytic streptococci had not been found in the culture taken from the wound at the first operation. In certain cases (for instance in streptococcal infection) suture had to be delayed as long as fourteen days. Fraser and his colleagues considered that the healing of wounds closed a few days after the primary operation was nearly as good as that obtained by immediate suture. Delayed suture was certainly the surer method, for there were only 4% of failures compared with 20% after immediate closure. Equally satisfactory results were recorded by Girling Ball [2] and Hepburn.[3] Quite recently Coller and Valk [4] have written on the method as applied to abdominal operations in which the wound is contaminated from the bowel. In such cases their custom is to suture the peritoneum and deeper layers of the abdominal wall in the usual way but to pack the superficial layer with flavine gauze after placing, but not tying, the sutures. In twenty-four or forty-eight hours the gauze is removed and the superficial suture tied. In 21 cases they had only a single instance of infection and that was only slight. It may be that the local application of sulphanilamide will make delayed primary suture safer, and even without this modern refinement a method which has such obvious advantages and was evolved after four years of intensive experiment deserves a place in the treatment of war-wounds to-day.

1. Fraser, F. *Brit. J. Surg.* July, 1918, p. 92.
2. Ball, W. G. *Brit. med. J.* 1918, **1**, 898.
3. Hepburn, H. H. *Ibid*, 1919, **1**, 181.
4. Coller, F. A. and Valk, W. L. *Ann. Surg.* August 1940, p. 256.

CATCHING PNEUMONIA IN THE HOME CIRCLE

ALTHOUGH secondary attack-rates for pneumonia have been calculated for an epidemic area [1] no attempt has hitherto been made to determine the rate of attack in family aggregations. At the Detroit convention of the American Public Health Association last month E. S. Rogers, M. Robins and M. G. Arnstein reported on 13,500 household contacts in a sample population of New York State. For pneumonia their figures show a remarkable preponderance of secondary attacks at the extremes of age.

Age of contact	Clinical type	No. of contacts	Secondary cases	Secondary attack-rate per 1000 contacts
Under 5	Broncho	625	24	38·4
	Lobar	740	13	17·6
5–14	Broncho	1480	11	7·4
	Lobar	1873	8	4·3
15–24	Broncho	853	3	3·5
	Lobar	1186	2	1·7
25–44	Broncho	1655	9	5·4
	Lobar	2073	11	5·3
45–64	Broncho	723	5	6·9
	Lobar	1091	11	10·1
65 and over	Broncho	232	2	8·6
	Lobar	302	6	19·9
All ages	Broncho	5662	54	9·5
	Lobar	7368	52	7·1
	All forms*	13,490	111	8·2

* "All forms" includes 460 contacts and 5 secondary cases among household contacts of index cases of unspecified pneumonia.

The authors point out that the high rate found among contacts under 10 years of age is not due to the concomitant household occurrence of measles or whooping-cough, since only 3 cases of measles and no whooping-cough were encountered in the 54 secondary cases in this age-group. The crude secondary attack-rate of 8·2 per 1000 household contacts may be compared with the rate for tuberculosis household contacts in two areas of the same state as reported by G. H. Ramsey, M. T. Bellows and H. F. Silverman at another session of the convention. The attack-rate from tuberculosis was 16·8 per 1000 household contacts, which is ten times the incidence for the total population of upstate New York. When adjusted for seasonal variation the pneumonia attack-rate is reduced from 8 to 6 per 1000, but even then it is 28 times the risk experienced by the population at large.

RECTAL SULPHANILAMIDE

PERSISTENT vomiting is a complication of the treatment of infections by sulphanilamide and may interfere with accurate dosage. Hence the possibility of using other routes of administration has been, and is being, studied. Intravenous medication, whilst often simplest, demands asepsis, a product which can be injected intravenously and a vein into which it can be injected. Furthermore four-hourly intravenous therapy becomes tedious. Rectal administration, however, can be carried out by any trained nurse. Turell, Marino and Nerb [2] have compared the absorption of sulphanilamide by the colon and rectum from a solution of the drug and from suppositories containing sulphanilamide. The concentration of sulphanilamide in the blood after the suppositories was inadequate, but the solution gave a concentration comparable with that resulting from administration by mouth. For instance, after giving 12 g. of sulphanilamide in the course of 48 hours they found the total concentration in the blood to be 10 mg.

1. Gilman, B. B. and Anderson, G. W. *Amer. J. Hyg.* 1938, **28**, 345.
2. Turell, R., Marino, A. W. M. and Nerb, L. *Ann. Surg.* September, 1940, p. 417.

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of free and conjugated sulphanilamide. They suggest that the total dosage should be the same as that given by mouth and this is supported by their figures. One case they describe suffered from nausea, and this is a reminder that the vomiting of sulphanilamide is, in part at least, of central origin. It is unfortunate that the poor solubility of sulphapyridine in water precludes the rectal use of an aqueous solution but the difficulty will perhaps be overcome in other ways.

REFINED ANTITOXIN

REFINED antitoxin resulting from the peptic digestion of the crude product was introduced to this country by Pope[1] in 1938, after its discovery in America. The digestion process is applicable to antitoxic but not to antibacterial sera, and seems to give better yields with some antitoxins than with others. Its use clinically enables large doses to be given in very small volume and with only a low incidence of serum reactions. Yet some workers have been wondering if these refinements in antisera are being obtained at the expense of clinical effectiveness, and they point to the persistent fatality-rate in diphtheria. The experimental evidence is reassuring, for Glenny and Llewellyn-Jones[2] have shown that refined diphtheria antitoxin injected subcutaneously into guineapigs is absorbed more quickly, and, surprisingly, is retained longer in the tissues than the chemically concentrated antitoxin. Corroborative clinical studies are needed—for example, it would be a useful practical point to find out if refined tetanus antitoxin given prophylactically protects the individual for as long as an equivalent dose of unconcentrated antitoxin. And again, it would be important to know if refined antitoxin has a greater facility than its crude counterpart for combining with toxins already in the tissues. In this connexion the (unpublished) observations of Hartley are apposite. He showed that guineapigs—or guineapig uterus—could be passively sensitised to diphtheria antitoxin if the antitoxin was derived from guineapig, rabbit or man, whereas antisera from horse, ox, goat, sheep and pig were ineffective. Refined horse antitoxin was no more acceptable to the guineapig tissues than the crude product. His findings suggested some chemical or biological affinity among the antitoxic globulins of man, rabbit and guineapig, and there seemed some support for this view in the differences established by Goodner and Horsfall[3] between horse and rabbit antipneumococcus sera. It will be remembered that these workers showed the rabbit antibody molecule to be only about a third of the size of the corresponding horse molecule, which, they suggested, made the rabbit serum more diffusible in the tissues.

The aim of serum-therapy must be to supply a substance which, besides a high content of antibody, should have an avidity for the homologous toxin and should be as little foreign to the human body as possible, so that by being adsorbed and retained by the poisoned tissues it may effect the maximum neutralisation of toxin. The preventive and curative use of serum from cases of convalescent measles, and in America scarlet fever, are examples to be emulated. If this could be done the other drawback, namely, the risk of anaphylactoid reaction when a second dose of serum has to be given a few weeks after the first—and with air-raid casualties this is a real risk—might also be lessened. To overcome this danger Coghill and his co-workers[4] have prepared a refined antitoxin by digestion of the crude serum with Taka-diastase, a complex enzyme with proteolytic, lipolytic and carbohydrate-splitting properties. This product caused only mild anaphylactic symptoms in guineapigs sensitised to normal horse-serum. The altered specificity, or "despeciation" as the authors call it, is attributed by them partly to purification and partly to some chemical alteration in the antibody-molecule, possibly in the carbohydrate portion of the globulin Although a peptic digestion did not give the "despe. ting" effect there may in fact be some immunological a.fer-ence between the biologically (peptic) and chemically purified antitoxins.[2]

1. Pope, C. G. *Brit. J. exp. Path.* 1938, **19**, 245.
2. Glenny, A. T. and Llewellyn-Jones, M. *J. Path. Bact.* 1938, **47**, 405.
3. Goodner, K. and Horsfall, F. L. *J. exp. Med.* 1937, **66**, 413, 425, 437.
4. Coghill, R. D., Fell, N., Creighton, M. and Brown, G. *J. Immunol.* September, 1940, p. 207.

OXYGEN FOR MIGRAINE

Alvarez and Mason[1] have reported the effect of administering pure oxygen through a B.L.B. mask to patients with severe headache. The treatment is purely empirical, and has no physiological support at all, but the authors are impressed by the improvement that they obtained when the headache was migrainous in type. Altogether 97 cases were treated, the oxygen being administered during the period of headache. Most patients were only treated once, but some had as many as ten periods of inhalation. On clinical grounds the headaches were divided into those of typical and atypical migraine, and those which had no relationship to migraine; 42% of subjects with migraine were relieved completely during the attack and 36% were much improved; by contrast only 12% of those with non-migrainous attacks were much improved while none was completely relieved. Even in the migrainous patients the results were as variable as those experienced with ergotamine tartrate, but the disparity between the response obtained in migrainous and other forms of headache suggests a specific action of oxygen. Viewed conservatively, however, the results are not so encouraging as would appear from the figures quoted, for the authors say that some headaches were relieved within 15 min. of beginning to breathe oxygen, while inhalation for 2 hours was needed in other patients. In other cases, again, the headache returned an hour after inhalation had ceased and it did not subside until the end of a further hour's administration. When the variable nature of the migrainous attack is considered, such results cannot be attributed to the therapeutic procedure in some of the cases, and many neurologists have already discarded the administration of oxygen in migraine in favour of ergotamine tartrate or even phenobarbital. Unfortunately, the exact changes in the intracranial vessels which appear to be responsible for migraine are not yet fully understood, although within the last few years enormous advances have been made in our knowledge of the functional activity of the cerebral vascular network. It is probable that a rational and truly effective form of therapy will not become available until the intracranial vasomotor changes are fully appreciated and methods to counter these changes are made available.

TWO NEW VIRUS DISEASES OF MAN

THE last twenty years of the nineteenth century will be remembered as the golden age of bacteriological discovery; the period between the two world wars deserves equal credit in regard to virus research. Not only many long-known diseases but also many new ones have been traced to virus infection. To the long list of viruses capable of attacking the nervous system must now be added two new-comers, one from Soviet Russia and the other from Uganda. In 1937 cases of human encephalitis were described in the Soviet far east by Chumakov and Gladkikh.[2] The disease, known as Taiga or spring-summer encephalitis, is endemic in various well-wooded localities and makes its appearance about the end of May or the beginning of June—a period

1. Alvarez, W. C. and Mason, A. Y. *Proc. Mayo Clin.* Sept. 25, 1940, p. 616.
2. Chumakov, M. P. and Gladkikh, S. G. *Bull. Biol. med. exp. U.S.S.R.*, 1940, **7**, 2.

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before the appearance of the mosquito plague—but cases continue till September. The people affected are wood-cutters, hunters and others whose occupations take them into the forests. The onset is sudden with fever, vomiting, meningismus, loss of consciousness and often flaccid paresis, paralysis and atrophy affecting especially the muscles of the upper limbs and neck. From the brains of three people who died of the disease, and from the blood of one patient, strains of a virus pathogenic to mice have been isolated. In many ways the new virus resembles those of St. Louis and the Japanese B encephalitis, although it appears to differ in antigenic structure. It is transmitted by the bite of the tick *Ixodes persulcatus* Schulz 1930, thus resembling the virus of louping ill which is carried by *I. ricinus*. Unlike louping ill, however, the Soviet virus is said to be hereditarily transmitted by the tick, which suffers no ill effects. Pavlovski [3] incriminates two other ticks as vectors, *Dermacentor silvarum* Olen. and *Hæmaphysalis concinna* Koch, in both of which hereditary transmission occurs. The same virus has also been isolated from the brains of wild rodents such as squirrels and hares living in endemic areas. Chumakov and Seitlenok [4] consider that the disease is not confined to the far east of Siberia because the sera of persons from western Siberia and from places in European Russia, Belarussia, Perm and Kirov contain antibodies to the virus. Belarussia is a western district adjoining the Polish frontier. This tick-transmitted encephalitis is apparently quite distinct from the Russian form of equine encephalomyelitis, though whether the Russian, like the American, equine encephalomyelitis virus is pathogenic for man is still unknown.

Another neurotropic virus has recently been found in Uganda by Smithburn and his colleagues [5] of the Rockefeller International Foundation. The virus was originally isolated from the blood of a woman who showed no symptoms except slight fever. When the virus was inoculated into the brains of mice they developed nervous symptoms and died, as did rhesus monkeys inoculated intracerebrally. The degenerative changes present in the Purkinje cells of the cerebellum recall those produced by the louping-ill virus, but there is no cross immunity either with this virus or with those of Japanese B or St. Louis encephalitis. Sera from natives of the West Nile district of the Northern Province of Uganda contain immune bodies against the new virus. Further observations are required to determine its distribution in Africa and elsewhere.

MODERN TREATMENT OF EPILEPSY

FOR the last hundred years people have been curious about the nature of epileptic phenomena, but only in the last ten, thanks to the electro-encephalogram, have we gained any real insight into it. Epilepsy, writes Lennox,[6] is a symptom of a disturbance in the electrochemical activity of the discharging cells of the brain; it is a paroxysmal cerebral dysrhythmia. Such dysrhythmia does not always produce fits, but it certainly predisposes to them, and it is found not infrequently in the parents of epileptics.[7] [8] Its discovery and treatment opens up a new vista of therapy. Cellular physiology plays an important rôle in epilepsy: for instance, alkalosis and œdema of the brain enhance the frequency of fits, acidosis and dehydration diminish them.[9] This led clinicians to try giving a ketogenic diet and restricting fluids, but in neither case was the success commensurate with the discomfort. Moreover it was soon realised that measures like these did not strike at the root of the trouble. Therapeutic asceticism has given place to a diligent trial of anticonvulsants.

Some difference of opinion has arisen as to how far Luminal can be pushed. In America it has been suggested that each patient has his optimum dose, and there is no need to be afraid of giving gr. 9 a day or even more if necessary. To obviate the drowsiness, or possibly ataxia, which these large doses may cause, Cohen and Myerson [10] give benzedrine sulphate in doses up to 20 mg. a day, and this drug may possibly reinforce the action of luminal in controlling seizures. Lundin, epitomising Scandinavian experience, finds [11] this combination can be given for long periods, with benefit to mental outlook and stability. In a few instances attacks of petit mal were controlled better with the two drugs in combination than with luminal alone. On the other hand, Stone, Finkelman and Arieff found [12] the addition of benzedrine to luminal in nine cases failed to combat drowsiness, although it was apt to prevent sleep at night and in two patients gave rise to tremor and apprehension. Evidence of the value of Epanutin (Dilantin, sodium diphenylhydantoinate) is accumulating. Lundin's results accord well with those of others, although he provides yet another name (Epifenyl) for this unfortunate drug. There is, however, little if any margin between therapeutic and toxic doses; the commonest drawbacks are nausea, nystagmus, tremors and paræsthesiæ which occur early; less common are rashes with pyrexia later on. Lundin saw one case of hyperplasia of the gums and three of mental derangement, one at least clearly attributable to the drug; and Williamson has just reported [13] four deaths during epanutin treatment of twenty mentally defective epileptics. Toxic symptoms came on after the drug had been taken for six weeks or more, although the dosage was not unduly high; low-grade subjects were more intolerant of the drug than the higher grade, the cause of death being status epilepticus in three cases and bronchopneumonia in one. In so uncertain a disease as epilepsy there is special need for care in tracing cause and effect, but every case of "intercurrent" death during epanutin treatment should be considered in the light of his findings.

Blair has made [14] a critical survey at Cane Hill of the merits of all the anticonvulsant drugs now in general use, discussing their pharmacological action and therapeutic use. He joins Lennox in condemnation of a defeatist attitude, having satisfied himself that with patient and efficient trial of available remedies there are few epileptics who cannot expect reasonable control of their fits. He has a good hope that relief may be found for the victims of traumatic epilepsy.

Mr. Eric Gill, who died on Nov. 16 at the age of 58, will be regretted not only by those who appreciate his work as a sculptor and engraver but by anyone who enjoys reading a page of good type. His contribution to the printer's word is exemplified in the beautiful sans type which bears his name.

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3. Pavlovski, E. N. Summaries of Reports of the All-Union Conference of Workers in Microbiology, Epidemiology and Infectious Diseases, Moscow. Jan. 25–31, 1939 [in Russian].
Chumakov and Seitlenok, N. A. *Science*, Sept. 20, 1940, 264.
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On Sunday, Nov. 24, at 3 P.M., Dr. Henry Wilson and Dr. H. V. Dicks will open a discussion on the manifestations and treatment of war strain. Colonel J. R. Rees will be in the chair and the meeting will be held at the Tavistock Clinic, Westfield College, Kidderpore Avenue, Hampstead, N.W.3.

On Tuesday, Dec. 3, at 2.30 P.M., Prof. J. D. Bernal, F.R.S., will address the Royal Institution on the physics of air-raids. The meeting will be held at 21, Albemarle Street, London, W.1.

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Special Articles

OCCUPATION THERAPY FOR WAR NEUROSES

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(From an E.M.S. Neurological Unit)

SINCE the first occupational-therapy department was opened in Glasgow Royal Mental Hospital, as described by Henderson,[1] much has been written on the advantages to the nervous or mental patient of occupation calculated to develop new interests, utilise latent capacities, and bring him back to a successful relationship with society; experience has shown that the nursing of these patients has been made easier, and the wards happier and more contented. In recent years, however, trends in occupation therapy have threatened to diminish its value by over-emphasising some features to the neglect of the total possibilities. The therapist, still an innovation in the less up-to-date hospital, has had to withstand a certain critical conservatism on the part of the nursing and administrative hierarchies. Becoming unduly self-conscious of his significance and devising new techniques, he has ignored the other functions of the hospital and grown increasingly isolated. This divorce has too often produced the anomalous position of one group of patients "helping in the hospital" and another "having occupation therapy."

On the outbreak of war I was given the task of organising occupation therapy for a neuro-psychiatric unit of 200 beds in an E.M.S. hospital of 800 beds, and received continued assistance and encouragement from the medical superintendent and the senior clinical staff in building up a coördinated scheme. By the beginning of 1940 the unit was being used for cases of war neurosis and in time civilian cases were entirely replaced by service patients. The cases included ordinary neuroses in which army service was but an incident, anxiety depressions precipitated by war service, hysterical cases, recent and late post-traumatic syndromes and, since May, the acute neuroses produced by intensive bombardment in Flanders.

The hospital had been selected for the E.M.S. because it had previously been a training centre for unemployed and had advantages for occupational training. It stands in a farm of some 25 acres with poultry yard, piggeries, vegetable gardens and greenhouses. The instructor in sign-writing had been retained, and had a shop capable of holding some 30 patients who could be instructed in ticket-writing, mechanical drawing, model-making, and woodwork. Some months later a woman occupation therapist was appointed and a pleasant room in the hospital provided for her, with material for rug-making, weaving, knitting, and other handicrafts. In addition, the maintenance departments of the hospital included carpenter's, tailor's, and upholsterer's shops, with trained workers in charge; a well-appointed gymnasium and an instructor were also available.

AN ORDERED ROUTINE

In formulating the programme I took account of the time during which the patients were to be occupied, the aim being to let occupation fill a portion of the day comparable rather with the healthy man's hours of work than with the invalid's period of treatment or recreation. This avoided "hospitalisation"—that insidious adaptation of the individual to an idle and abnormal existence at the very time when he is undergoing treatment for a failure to adapt to greater demands. The hours finally arranged were 9.30 A.M. to 12 noon and 2 P.M. to 4 P.M.; on Wednesday and Saturday active treatment ended at noon and on Sunday no occupation was given. Passes from the hospital—given freely to suitable patients—were granted from 4.30 to 8 P.M. on full days and from 1 P.M. on Wednesday, Saturday, and Sunday. This was adhered to except in special cases, and later it was found desirable to limit to these free periods the many entertainments and outings offered locally to service patients.

In order to promote a feeling that occupation was the normal routine a patient was introduced to it as soon as possible. It has been found practicable to have about 75% of the patients in the ward in active occupation; the remaining 25% were new admissions still undergoing examination, patients having other treatment and those considered unsuitable by their physician. Every hospital activity was utilised as far as possible to provide satisfying employment, leaving plenty of scope for ingenuity and resource in meeting individual needs. This wider programme has prevented the illogical separation of work and occupation therapy, but watchfulness has been necessary to prevent the staff from gradually exploiting patients in the running of the hospital instead of bearing in mind that the well-being of the patients is the only justification for the hospital's existence. By keeping every form of work, including the ordinary ward cleaning, under the supervision of the occupation department, and by having each patient's work prescribed by his physician, it has been possible to make every patient realise that occupation is part of his treatment.

VARIETIES OF OCCUPATION

In the occupation room the woman therapist has charge of the more orthodox activities, and assisted by nurses in the wards, she is also responsible for the occupation of bed patients. Relatively few patients elected to do crafts here, and attention could be given to those requiring an individual approach. A number of depressive and post-traumatic patients have found the quiet of this section beneficial, and its importance as a transition stage in the treatment of the acutely disturbed war neurotics has been increasingly recognised. Heavier handiwork is done in the sign-writer's shop, where patients learn lettering and sign-painting and where individual tastes in painting, drawing and model-making can be gratified. By arrangement with the steward and matron, waste-paper baskets, knife-boxes and signboards have been supplied to the hospital from these sections, thus diminishing expenses for material; and the patients have been asked to pay for the materials of articles they make for themselves. The carpenter's shop has proved popular, and the speed with which untrained men have developed facility in the use of tools is striking. Under the control of one instructor, up to 20 or 30 patients can be employed in furniture-repairing or in making articles for themselves. In the upholsterer's shop the work is mainly the carding and teasing of wool and the stitching and packing of mattresses; the quietness and relative monotony have appealed to some anxious patients; but patients of lower intelligence who were originally thought suitable for it were later found to require more change and variety. Some men have found satisfying employment in the tailor's shop, making and repairing hospital bedlinen and uniforms, but others thought the work beneath their dignity; valeting or repairing their own or their comrades' clothes has been more popular. Gardening, like the handling of tools, appears to satisfy one of the essential needs of the average man; the farm and garden have provided work in the open air, ranging from light tasks like the thinning and weeding of seedlings to the heaviest manual labour. Heavy labour has been of great benefit to some; the average working-man may find work requiring concentration on detail a weariness and oppression. For the agricultural workers who have broken down through failure to adapt to army life farm work has proved almost a specific and has allowed of a speedy return to their proper field.

Physical training has also been included in the sphere of the occupational department. A class of graduated physical exercise has replaced occupation from 2 to 3 P.M. for those patients doing sedentary work. Special classes in remedial exercises have been arranged for individual patients at other hours. Recently a proposal has come from the surgical side of the hospital that selected occupations should be used to provide remedial movements for patients disabled as a result of injury.

1. Henderson, D. K. and Gillespie, R. D. Textbook of Psychiatry, London, 1933.

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This will involve a liaison with the massage department. The possibility has been kept in view of giving vocational training to cases so much disabled that they can no longer follow their old civilian occupation.

A medical officer was put in charge of the occupational department which has thus been given its proper significance. Where so many sections of the hospital's life are invaded only a doctor possesses sufficient prestige to introduce new ideas and to adapt and give way without losing his footing. A member of the male nursing staff, later known as the occupational attendant, who had some occupational experience and a technical artisan training and who in addition was intelligent, resourceful and tactful, supervises the coming and going of patients. In practice it has been found possible to depute to him much of the day-to-day adjustment of work. From the beginning, however, both the medical officer responsible for occupation and the occupational attendant have taken it as an axiom that their responsibility is derived from the patient's own doctor and ward-sister. While a certain independence is essential to coördinate and unify, care is taken not to arouse antagonism nor to claim independent authority. In the separate sections the therapist, instructor, or worker is never dislodged from his position in charge. Great importance has been attached to the consistent maintenance of these fundamental attitudes, and the relatively smooth working of the scheme must be attributed to adherence to them.

OCCUPATION CARDS

Work is prescribed as follows: a card with suitable headings is placed in each case-record on admission; in this the doctor fills in the patient's name, age, and civilian occupation, with a brief note on his condition and a recommendation or suggestion for suitable occupation; these cards are left with the sister of the ward and collected each morning by the occupational attendant, who allocates the patients. It has been found necessary for him to keep a list of the allocations in each ward. At 9.30 A.M. and at 2 P.M. he collects the patients and takes them to their appropriate sections, where the therapist or worker in charge keeps a list of his patients. If necessary, a nurse is placed with a patient, since the worker cannot be responsible for a patient requiring special observation or care. A week before a patient's discharge or on the request of his physician, a report is submitted on the man's performance and behaviour in occupation. This is often unexpectedly revealing, sometimes giving an entirely different impression from what might have been expected on the evidence of ward behaviour or of interviews with the doctor. It is also of value in making recommendations for the patient's future when the question of invaliding or discharge to duty arises.

While the average patient is glad to have occupation, none is immune from human weakness, and classes are not infrequently missed. One of the healthy features of work is its recurring inevitability and accordingly attendance at occupation is given the force of a medical order. The formula that patients not feeling well enough to attend occupation are not fit to have outside passes usually proves effective, but patients who refuse to attend occupation or consistently make difficulties are referred to their own doctor, and some have had to be sent by him for military disciplinary action. Although these cases are rare, appeal to the military authorities had sometimes to be made to prevent lethargy and disaffection; for it was early discovered that the average soldier, accustomed to extracting the amenities of existence from a life hedged in with restrictions, considers it a point of honour to ignore regulations.

SUMMARY

A short account is given of the organisation of occupational therapy in a hospital for neurotic casualties. The factors determining success have been found to be as follows:—

The work done, as far as possible, should be useful.

The occupational-therapy department should not be an isolated unit, but an integral part of the whole hospital routine.

In order that this may be attained and maintained without friction the department should be under the direct and single control of a medical officer, who provides prestige, authority, and adaptability to new circumstances.

The work should be as varied as possible, and should resemble, in quality, quantity and actual heaviness of labour, that usually performed by the patient in ordinary life.

The patient's own physician should prescribe the type of work he is to undertake.

Occupational therapy should be regarded as an individual therapy as much as psychotherapy, chemotherapy, or any other form of treatment.

CEREBROSPINAL FEVER IN GERMANY

Two recent articles in the German medical press appear to give some clue to the incidence of meningococcal disease in Germany since war began; they also reveal, so far as this disease is concerned, the present state of chemotherapy in that country. Both the series of cases described are small and sporadic in incidence. Neither from these cases in Remscheid and Hamburg, nor from the quoted German literature, can we gather any evidence of an epidemic prevalence of the disease comparable with that which has prevailed in this country during 1940.

Horst and Paul[1] having treated 16 cases with combined uleron and serum, seem quite satisfied with a case-fatality rate of 18·7 per cent. Four of the cases were infants, eight were young children and the remainder adults. Of these, two infants and one woman aged 54 died. This result is compared with 20 deaths in a series of 30 serum-treated cases during the years 1930–38, a mortality of 66·6 per cent. Emphasis is laid on the mode of administration of uleron. The authors are impressed with the near relationship of the gonococcus and the meningococcus, and have applied to the treatment of meningitis methods similar to those employed in the treatment of gonorrhœa with uleron in Germany. The tablets were given by mouth in three courses each of three days' duration, each course being separated by an interval of five days. The treatment of each case thus extended over a period of nineteen days. The daily dose for infants was 2 g., for children 4·5–6 g. according to age, and for adults 7·5 g. The drug was administered three times daily. The authors consider that this method of high dosage in short courses gives better results than a protracted continuous course of small doses which, they say, tends to uleron-fastness. The combination of the drug with serum, as being theoretically sound, is also favoured. The average duration of hospital treatment in the uleron series was 31·8 days, and in the earlier serum-treated series was 44·4 days. It is difficult to avoid the impression that in the chemotherapy of meningitis the authors have hardly progressed beyond the stage that was reached in this country in 1937 or 1938.

Somewhat more advanced ideas are expressed by Säker[2] of Hamburg, who has treated 43 sporadic cases from the beginning of 1939 to date. The drug used was sulphapyridine, under the proprietary name Eubasinum. Daily lumbar puncture was also employed but no serum. In this series there were three deaths, but the author suggests the exclusion of an infant admitted moribund and a woman of 67 with intercurrent disease, thus leaving one genuine failure to 40 successes. Eight of the cases were under one year of age, and in this group was the one admitted failure. The average duration of the illness was five days. The author emphasises that these favourable results were obtained in *sporadic* cases. He would expect a higher percentage of failures in an epidemic, with its larger proportion of very acute cases, especially in infants. The action of the drug, he states, is limited by the latent period (about 6 hours) that elapses before bacteriostasis begins; this is the vital factor in the hyperacute cases. He found that on the second day of treatment the culture would usually not grow, and only on the 3rd and 4th days was there full destruction of the meningococci. The latter time corresponded with the decline of meningeal inflammation, which ended after a further three days. An additional

1. Horst, H. and Paul, R. *Dtsch. med. Wschr.* Sept. 27, 1940, p. 1081.
2. Säker, G. *Ibid*, Sept. 20, 1940, p. 1039.

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measure considered to be of importance was daily removal of cerebrospinal fluid, but not serum treatment. Meningococci were seen in all the cases but were cultured in only half. No typing of the organisms was done. The total amount of sulphapyridine given varied between 12 g. and 30 g., according to severity, and averaged 20 g. The drug treatment was continued until the fluid became clear. It was administered by mouth except in the stuporose, when it was given at first by rectum. The daily dose for adults was 3–4 g. for the first few days, and this was reduced by 1–2 g. daily for some further days. In infants and children great care was taken with the initial dosage, which was higher proportionately than in adults, and was generally about half the adult dose.

Fifteen German publications are quoted all dealing with small numbers of cases, mostly 6 to 20. The largest of these series is that of Hoppe in which 39 cases were treated with sulphanilamide with 8 deaths. In this literature four series were treated with sulphapyridine and serum, four with sulphanilamide and lumbar puncture, and three with Albucid and lumbar puncture. On this basis the author gives his impressions of the relative value of the various sulphonamides. Sulphapyridine is placed first, then sulphanilamide, and third, albucid. Uleron and Prontosil Rubrum he considers to have too slight an action against meningococci.

Certain differences between current German and British practice revealed in these articles may possibly be due to lack of experience in Germany of chemotherapy in severe epidemics. Säker's 43 cases appear to be the largest chemotherapeutic series yet published in Germany, and he claims that his results are better than most. His gross mortality of 7 per cent. in 43 cases is about the same as a corresponding British series of sporadic cases published [3] a year earlier, namely 6·6 per cent. in 76 cases, and the complication rates, both of which included two cases of complete bilateral deafness, are not dissimilar. Säker's dosage of sulphapyridine is, however, distinctly smaller than that which we employ. Whether this low dosage would be sufficient for severe epidemic cases is doubtful. There is a curious absence of any reference to difficulties caused by drug intolerance, especially nausea and vomiting. Nor is there any mention of intramuscular or intravenous injection, nor of any soluble preparation suitable for this purpose. The insistence on daily spinal drainage until the fluid is clear appears old-fashioned, since it has been the experience of many in this country, e.g. Williams and Brinton,[4] that the majority of cases need no more than a single diagnostic lumbar puncture. On the other hand, this German writer at least definitely considers serum to be unnecessary as additional treatment. Although difference of opinion on this point evidently exists in Germany as in Britain, the tendency to rely upon chemotherapy alone is undoubtedly increasing in this country and has at last received official sanction in the recent memorandum issued to the Army Medical Service.[5]

EXTRA-MURAL WELFARE

WITH the great expansion of industry the army of workers has been reinforced by many fresh recruits. They have poured into industrial towns which were already overcrowded and into country places where large factories have been built. They need to be housed and fed, transported to and from their work and provided with facilities for recreation in their leisure hours, but they have often been left to shift for themselves and bivouac where they can. The problem is fourfold, because the needs and interests of grown men and women and young boys and girls are all different; and the provision made for them must depend upon whether they are living in towns or country districts. When the factory department of the Home Office was transferred to the Ministry of Labour, additional welfare officers were appointed to deal with what might be called extra-mural welfare. Vernon has pointed out [6] that apart from the risks of his occupation the worker's bodily and mental health is affected more by his social environment than by factory conditions. His output is greater if his health is preserved, if he does not become overtired, and if he can properly relax mentally and physically when he is away from the factory. A special correspondent to the *Times* describing current conditions in industry [7] suggests that if workers come to feel that the aim of welfare work is solely to increase output they will mistrust it and with reason. They would scarcely let doubts of the kind influence their present drive, but they will expect the state to prove, when the acute need is past, that this interest in the workers is not temporary and utilitarian. What we do now must be the first step in a maintained advance. As doctors we are not concerned with the politics of it; we know that welfare work, well devised and tactfully carried out, means a gain in health. But the problem is not entirely one for the welfare worker.

As far as grown men and women in an industrial town are concerned, the problem is largely solved if comfortable billets can be found for them. There are cinemas, public houses, working men's clubs, the social organisations of churches and chapels, public libraries and all the other amenities of a town available to them. They probably will not lack a chosen recreation, but they may lack the comfortable billet. Many industrial towns are now so overcrowded that living conditions cannot fail to be uncomfortable and bad for health. No welfare worker can alleviate this. The only way to overcome the difficulty is to provide more houses, either permanently or temporarily, and that is a job for the Government. One way to make up for uncomfortable quarters is to provide places where people can meet and eat and amuse themselves, and if the working men's clubs are roomy enough to cater for the influx the men at least will be supplied. Private people, too, in some places are throwing open a room for workers, in which they can spend their leisure time; a furnished sitting-room with writing-tables, books and papers and a fire always going makes a pleasant resort for those who like to spend their evenings quietly, and a hundred such rooms in a town might easily provide accommodation for a thousand people. Young people under twenty, however, will need a good club; and this is not so easy to provide. Military authorities and other Government departments have taken over houses and property for military purposes and for billeting troops, with the result that recreation halls and clubs for young people are no longer available for civilian use. Quite simple clubs will serve in an industrial town, houses perhaps in an old army hut, provided that a capable person is in charge. Separate clubs are needed for boys and girls, though they would be able to meet for dances and social evenings. Communal feeding of workers is already provided in the canteens of large factories, and the number of factories with well-equipped and comfortable canteens is rapidly growing. The provision of canteens in all works could, of course, be made compulsory if this seemed an advantage. In the last war the Ministry of Munitions had canteens provided in all the industries for which it was responsible. It should not be difficult to keep the canteen open for workers in the evenings if they liked to use it, and in towns many little eating-houses cater for those who prefer to eat outside the works. The difficulties of married women in industry are lessened by the provision of day nurseries for their children.

In country districts the picture is different. Billeting of workers presents a difficult problem, and once local accommodation has been exhausted can be achieved only by building homes for them or by providing transport to places where lodging is available. Neither task comes within the province of the welfare worker. Transport at present is often inadequate. We have heard of workers who leave home at 5.0 A.M. and travel two hours to get to work, returning at 9 or 10 at night. Few people can stand this sort of strain for more than a short time without a breakdown. Little attempt has so far been made to relieve traffic congestion by staggering hours of work, though this has been promised. In most places workers pour out at the end of the day, sometimes from several factories in the same area, and struggle to find seats in trams and buses which offer targets to enemy aircraft. Once difficulties of billeting and transport are overcome

3. Banks, H. S. *Lancet* 1939, **2**, 921.
4. Williams, D. and Brinton, D. *Ibid*, 1940, **2**, 482.
5. H.M. Stationery Office, October, 1940, 2*d*.
6. Vernon, H. M. Health in Relation to Occupation, London, 1939.
7. Oct. 18.

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the problem of recreation in country districts is not serious in summer; people who have been in a factory all day will then gladly spend the evenings in country fields and lanes, but for at least five months in the year they must have some indoor recreation. Probably the adults would like something which captures the club atmosphere of the public house, a place where they can sit and chat with other people, play an occasional game of darts or dominoes and get a drink if they want it; but it must also be a place where the man who does not want to drink will not feel out of place. A room should be reserved for women, and they would of course be allowed to go into the other rooms if they wished. A central club of the kind would not be useful if people were widely scattered, and in that case it becomes doubly important to provide them with comfortable billets where they can find their own recreation; if their billets are uncomfortable they are very hardly done by indeed.

A club room is as necessary for the young people in a country district as in a town, perhaps more so. An army hut or a village hall can be used, some kind of entertainment or attractive gathering being offered every night, including Sundays. Whist-drives, dances, concerts, social evenings and cinema performances are always popular; libraries of substandard films are now available and the travelling cinema can provide the projector. E.N.S.A. will no doubt arrange performances. Lecturers on politics or subjects of general interest are sometimes welcome.

Welfare workers must therefore have a wide aspect of their task in mind. Where social work has developed gradually in an industrial neighbourhood the problems have been difficult enough and not all of them have been solved; but those who start from scratch to establish it in a newly fledged war industry must be people of imagination and insight. They should know how the workers live, and once appointed they should be given a free hand because efficient and sympathetic welfare work cannot be carried on by rule-of-thumb methods. But behind all welfare work are problems of billeting and transport, and unless these are solved first—or at least concurrently—the welfare workers will labour in vain for the health and recreation of the industrial army.

Public Health

INCUBATION AT 44° C. IN THE EXAMINATION OF WATER-SUPPLIES

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THE capacity to produce acid and gas in MacConkey's fluid medium at 44° C. as characteristic of true *Bacterium coli* in water has been accepted by several workers since the report of Wilson in 1935, and is advocated, though with caution, in the Ministry of Health report of 1939. Raven and others (1940) find the test very reliable for the waters in the Liverpool area, for the number of other organisms reacting in this way was small.

In the North-East Derbyshire area, on the other hand, the test has been found of little practical value since many of the members of the intermediate-aerogenes-cloacæ group found in the waters of this region also produce acid and gas at 44° C. From amongst these waters two which are not used as drinking water are given as examples since they show the local conditions in an exaggerated degree. Both waters give consistently high readings of the presumptive *Bact. coli* count at 37° C., ranging from 5–10 per 100 ml. in dry periods to the limit of determination during wet weather. Examination of the collecting areas shows that it is extremely unlikely that either receives any contamination from human sources, and on no occasion during a period of two years have typical *Bact. coli* been isolated from these waters. During the past three months parallel series of samples of these waters have been incubated each week in MacConkey broth 37° C. and at 44° C. The presumptive *Bact. coli* count obtained at 44° C. has every time been either the same as that at 37° C. or but slightly lower. On each occasion several of the cultures at each temperature have been plated out and some half-dozen colonies picked off from each plate. These isolated organisms have been tested according to the scheme given in the Ministry of Health report (1939), and in no case have typical *Bact. coli* been found. A different organism or variant has been consistently obtained from each of the waters; that from the first gives a positive methyl-red reaction, a negative Voges-Proskauer reaction, grows readily in citrate, does not form indole, produces acid and gas in MacConkey's medium at 37° C. and at 44° C.; that from the second gives similar reactions except for a reversal of the results of the methyl-red and Voges-Proskauer reactions.

Similar findings have been obtained with some organisms isolated from other waters in this area. Thus although we have never failed to get gas production at 44° C. with typical *Bact. coli* this test alone is not sufficient for presumptive identification in this area.

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Brucella Infection

THE discovery of *Brucella melitensis* in the milk of some cows in a Midland herd, revealed by Mr. F. W. Duke in his short article in our issue of Oct. 26 (p. 517), may cause some uneasiness, for, of the three known species of brucella, melitensis is by far the most dangerous to man. Though somewhat locally distributed, *Br. abortus* is not uncommon in milch cows in Britain, and since most milk in this country is still unpasteurised infection of man by that organism must be frequent; yet though we have been on the lookout for human brucellosis for several years the number of cases recorded is small. The disease of man caused by *Br. abortus* is, however, very indefinite and doubtless many atypical cases occur in which their true nature is not suspected. Man is much more susceptible to *Br. melitensis*, proved by Bruce in 1887 to be the cause of what was then known as Malta or Mediterranean fever, a disease which was by no means uncommon until it was found to be spread by goat's milk and readily prevented either by avoiding goat's milk or by boiling it. So far as we know, *Br. melitensis* has never been found in goats in this country, and since cows are supposed not to harbour this species its discovery is surprising and unwelcome. The fact that no case of human Malta fever has been recorded in this country suggests that the passage of the organism through cows may reduce its virulence to man, but in the south-east of France there were numerous instances in which a cow became infected from neighbouring goats, excreted *Br. melitensis* in its milk and gave rise to cases of typical undulant fever in human beings. There is, of course, the possibility that melitensis infection might spread to our goats where it would find its normal host. The Brucellosis Melitensis Order of 1940 is fairly drastic so far as it goes, but its provisions can be applied only after the organism has been discovered, which might be not until a human outbreak of disease had occurred. But since all species of brucella are destroyed by pasteurisation we have an obviously efficient means of prevention so far as commercial milk is concerned.

Epidemiologists have for some years recognised the possibility of *Br. abortus* producing an epidemic disease of man of some consequence, because of the known danger of *Br. melitensis*; but up to now epidemics of the latter have not been considered. Malta fever is less likely to be missed than abortus fever, for it is usually more severe. If the disease is suspected the diagnosis can be settled by the serum reaction, and it should now be a routine in cases of continued fever in which Widal reactions are sought to carry out the examination for the brucellosis reaction if that for the typhoids is negative or inconclusive.

Infectious Disease in England and Wales

DURING THE WEEK ENDED OCT. 19, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2149; whooping-cough, 1499; diphtheria, 1347; enteric fever, 37; measles (excluding rubella), 11,229; pneumonia (primary or influenzal), 732; puerperal

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In England Now

A Running Commentary by Peripatetic Correspondents

IN war-time the divine faculty of imagining yourself in someone else's place is apt to be swept away by a barbaric horde of emotions. I knew an old country doctor who had a passion for seeing the other man's point of view and used to make a game of it. If he came back from a meeting of the town council at which there were six people present he would think afterwards in hexagons, putting himself at each angle in turn. "Now let's get into the sanitary inspector's corner and see what he was thinking; now the mayor's." Ordinary visits would involve the consideration of a triangle, the patient's, the relative's and his own point of view; consultations, a square. Nor did the old doctor confine himself to human relationships. It was from him I got the idea of looking at a bacterial toxin from the bacteria's point of view—a ferment which, like propaganda and fifth-column work, goes ahead to prepare the soil for easy conquest and expansion. Similarly he looked on digitalis not primarily as a useful drug but as a poison the clever foxglove had made to keep off browsing kine.

We sometimes forget the intensely tragic nature of senile dementia. It is so common we are habituated to it; so like a physiological process we take it for granted; as far as I know no sufferer has ever written championing it. On the contrary its usual reception is the mocking smile, the taunt-tinted phrase, the superior amused condescension, which make one feel that man has not advanced much beyond the fowls that pick at their sick one's sore. Cancer has its heroics, tubercle its melodrama, but the old lady fighting a stubborn rearguard action against senile dementia—cut off from help, her own side ashamed of her, fighting a slow vegetative eating-away, not toxicated as in the acute diseases but on the contrary with occasional moments of acute insight when she sees the battle in cruel perspective, hopeless, helpless, ridiculous, intensely humiliating—only gets a jeer. It seemed so innocuous when it started—a lengthening of normal forgetfulness, an increase of ordinary hesitancy. Then "Where am I?" or "What is today?" or "What was I doing after breakfast, no, I mean, dinner?" Later on it gets to be commented on by one's dearest, who feel one's humiliation so deeply: "Oh, but, my dear, I've told you a dozen times . . ." Enmity may come in here, the most revolting hate in the world because it is transmuted love. Then to cover up the more glaring lapses the old lady makes up fables to explain them. "I'm sorry to tell you, doctor, she's becoming terribly untruthful, so unlike her." The old lady is fighting for more than life now, her place among the sane, and the fight goes on for years. One consolation she has, an old scrapbook of memories, but even here the pictures on the last pages are fading. Ordinary bodily needs are forgotten now, but sometimes realised; dirty clothes are hidden and poorly hidden. "Faulty habits," says the nurse; "secretive," writes the doctor. Then in one of her brief periods of perception she realises how she is being treated as less than human and gets furious. "They're after my money," "my house," "my cottage" or even "my teapot." "Unmanageable," says the relative. "Give me my keys, I shall do my own shopping." "Violent at times," writes the alienist. She tries to explain, but although the intonation gives an idea of her feelings the words tumble into and over each other. She's back to the stage of the animals who by growls or barking can convey their feelings but not precise information. It is the great primordial battle in reverse; once some speck of spirit that has grown to be ours fought its way into the animal world from the vegetable, now it is being driven back, fighting.

* * *

We have had two proper air-raids here in the middle of the night, and I had an hilarious time. The whole hotel have decided to have my room as their air-raid shelter, so they all come in here and array themselves round the room and keep me amused. They are a very mixed but gay crowd, and we make a terrific din and really enjoy ourselves—in fact the last time we made so much noise that we didn't know whether the "all-clear" had gone. You should see the array of trousers and hair curlers that arrive, really stunning!

The writer of that letter is a girl who broke her back in a motor accident a year ago. She is in a hotel under an osteopath and talks about the time when she will again walk up the steps of the institution where she is employed as a clerk. She was taken to one of our leading orthopædic surgeons who advised a laminectomy in the faint hope that it might relieve the pressure; it failed to do so. Another orthopædic surgeon saw her and confirmed that she could never walk again; it was then that she went to the osteopath. One cannot blame her for that—hope springs eternal in the human breast—but is it right to allow that hope to be misdirected? To guide it into a determination to lead a useful life from her bed would be better than to let it aim at the impossible until it becomes the hope that maketh the heart sick; by which time the mental effort will, in all probability, be spent and no longer be available for her to face life. My point is that when a patient is incurable in one part of the body, but may have long life ahead, the first thing is to get him or her to face life with the disability. She is talking of the day when she will walk up the steps to work to do her shorthand typing again. If she would face being carried in she might be able to do her shorthand and typing from a wheeled chair. But so long as she looks forward to walking again, she will never face life as a cripple. It is as though a one-legged man thought he could grow a new limb like a lobster. And so we may blame those who allow such a one to get, under these conditions, into an osteopath's hands. If a bomb fell outside the famous institution where she works, and, without destroying it, caused it to settle at one corner and lean over like the tower at Pisa, they would call on their engineer and he might say he thought it was worth trying to push it up again, but without much hope of success; and if he failed they might ask a consulting engineer for another opinion. But if *he* reported that it would stay put, but that nothing would push it up again, they would not go to someone else with a physics based neither on Newton or Einstein but on some strange principle of his own; nor would they believe him if he stated that he could lift the building up again by re-wiring it within and pointing it without. Yet that is what they do when they allow and even urge such a patient to go to an osteopath. With the building it would only mean a loss of money; with the patient it means the injury to a human mind. This would not matter so much if it were near extinction by an advanced consumption of which the patient did not know. But when it is one which may continue for many years and might if rightly guided be, in spite of physical disability, of use to the community, it seems to be wrong and even cruel.

* * *

With the world lousy with pyrotechnic displays you would have thought that the children would be willing to forgo fireworks this year, but such was not the case. The fact that outdoor fireworks were not possible was reluctantly accepted but it was hastily pointed out that the ban did not extend to the indoor variety. Accord-

(*Continued from opposite page*)

pyrexia, 144; cerebrospinal fever, 144; poliomyelitis, 36; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 47; ophthalmia neonatorum, 86. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 25 was 1414, including: scarlet fever, 274; diphtheria, 248; measles, 415; whooping-cough, 41; enteritis, 65; chicken-pox, 112; erysipelas, 40; mumps, 9; poliomyelitis, 2; dysentery, 2; cerebrospinal fever, 25; puerperal sepsis, 6; enteric fevers, 16; german measles, 6; other diseases (non-infectious), 78; not yet diagnosed, 75.

Deaths.—In 126 great towns, including London, there was no death from smallpox or enteric fever, 2 (0) from scarlet fever, 8 (1) from whooping-cough, 25 (0) from measles, 44 (1) from diphtheria, 38 (5) from diarrhœa and enteritis under 2 years, and 14 (3) from influenza. The figures in parentheses are those for London itself.

Fatal cases of diphtheria were scattered over 25 great towns; Liverpool reported 7 cases, and Plymouth 5. There were 16 deaths from measles at Liverpool.

The number of stillbirths notified during the week was 217 (corresponding to a rate of 37 per thousand total births), including 13 in London.

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ingly, a wet Sunday afternoon was set aside and prematurely blacked out and a terrific time was had by all with sparklers, lightning papers, serpents, vesuvii and what used to be called Bengal Lights but are now known by a more topical name. There were also some small hand-grenades fashioned in the likenesses of apples, pears and bananas which on being ignited spurted jets of coloured sparks and finally popped open with a quite unalarming bang to disgorge wooden whistles, brooches, napkin rings, paper caps and what not. Personally I think vesuvii are a sound line. Sparklers are good but one is very like another and after a time they tend to pall. On the whole I like serpents best; they easily head the list for evil-smelling smoke and I should urge Dr. Twort and Mr. Baker to inquire into its bactericidal effect. If serpents were brought into the shelters I am pretty sure that no pathogen would stay long. Few of the human inmates would stay long either and hence the problem of overcrowding would also be solved. There was a time when, by a sort of divine right of fathers, I used to do all the setting off but nowadays I have to muscle in hard to get even a sparkler to myself.

* * *

I have just been entertaining for the week-end a friend from London and his wife who have taken Lord Horder's advice to try a change of air and company. The man admits to having slept more soundly than he had done for many weeks, enjoying the absence of both friendly and foreign noises. But what if he were quite frank he would be saying to me is this:

"I felt a little out of tune with my new environment—with, dare I say it, the air of smug self-satisfaction that seemed to pervade the ancient town. The cakes piled high in the shop-windows, the concern of the inhabitants over their little comforts or the best means of preventing billeting, the oft-told tale of the month-old bombing, and the look of horror at our suggestion that a few well-directed bombs might help to modernise the sanitation of the place, all added to the sense of irritation. I got rather tired, too, of hearing from casual visitors to London that really the damage there was amazingly small. I thought of my own small department, of whom one in three have already had first-hand experience of bombing, and by Monday I was feeling something of what many of our Tommies must have felt when home on leave in the last war—a strong desire to be back again in the front line with all its perils and discomforts."

And I should be replying if I were equally frank: "I dunno whether your picture is right or wrong. Whether it is a product of air-raid morbidity or a flash of insight into us as we really are. But of one thing I am sure. Another couple of days here would cure you of your bomb snobbery."

* * *

I made a discovery about smells last week. I was going past our village church when I walked into a most lovely smell. I hunted about for a bit and eventually found twenty yards away one small spike of winter heliotrope. It is common by stables and churches because horses love it; presumably in carriage days it kept them quiet during long sermons. It didn't smell very strong and I vaguely wondered that I had nosed it so far away. A few days later I went into a cottage "best room" and again found a lovely smell. I looked round; there was only one plant among the pots in the window that was in flower—a primula wanda. I put my nose to it, it smelt only faintly, yet obviously it was where the smell was coming from. Then it dawned on me that some scents act at a distance; they have to be diluted to, say, one in a million, or oxidised before they are seductive to the human nose or the insects' antennæ or spiracles; a clever come-hither mechanism which probably acts at distances inconceivable to our gross turbinates, a cry for pollination, a sex appeal through an intermediary. The female of homo sapiens has stolen this cunning mechanism from the flowers for the same purpose, but with no intermediary, thank you. Now we come to another point—the scent of some flowers isn't nearly so pleasant or strong close to them; there is a sort of neutral zone very near the flower where there is hardly any scent at all. Is that why Mrs. A. has never discovered she has bromidrosis, and why Mr. B. says he has not got pyorrhœa?

Letters to the Editor

ANÆSTHESIA IN THE SHOCKED PATIENT

SIR,—The M.R.C. war memorandum on wound shock has a one-sidedness of approach to the subject of wound shock which culminates in a serious omission. Concentration on the hæmodynamic aspect of shock has resulted in a final dangerous statement on anæsthesia:

"Gas and oxygen, combined with ether if necessary, is the anæsthetic of choice . . ."

Recent work suggests that the use of local and regional anæsthesia is of primary importance in these cases. A. K. Henry [1] agrees with Abdelsamie's conclusion that emergency amputation of limbs under full Novocain analgesia "is a benign measure that does not shock the patient." Abdelsamie [2] noted that during amputation on a "poor risk" any painful, unblocked stimulus tended to make the pulse imperceptible; with full analgesia, on the other hand, the pulse remained unaltered and indeed would sometimes improve. Further evidence now comes from the Soviet Union. G. M. Novikov [3] records observations on 3180 patients (37·5% traumatic cases) operated on under local anæsthesia and considers that local anæsthesia itself was a factor which diminished shock. Psechniknikov [4] records his observations on the basis of the experience of a team of surgeons during the Finnish campaign who investigated the possibilities of local anæsthesia in war surgery. At the beginning of the campaign the surgeons all used general anæsthesia, but Psechniknikov began to use local anæsthesia for all his cases. With two tables in action it was easy to compare the condition of the patients operated on under general or local anæsthesia. When local anæsthesia was used the patient came out of the shocked condition while on the table. It was further noticed that the operating time in these cases was not appreciably lengthened.

On the basis of this and other available evidence we urge a reconsideration of the method of anæsthesia advised in the memorandum, and further exploration of the use of local anæsthesia in the prevention and treatment of wound shock.

RUSCOE CLARKE,
LIPMANN KESSEL.

London.

THINGS TO COME

SIR,—On two recent occasions you have shown a lively appreciation of the changing conditions of the medical world and a fearless readiness to indicate lines of a possible constructive policy. The fact that you have been ready to draw attention to the new situations and put forward suggestions which a few years ago would have been regarded as revolutionary has been encouraging to the increasing number of us who are acutely and gladly conscious that a chapter is closing and a new one is shortly to be opened.

One of your correspondents wrote that he "rubbed his eyes" as he read one of your leading articles. It is typical of the dwindling body he represents that a suggestion of profound changes in the world in general and medicine in particular, with the consequent need for radical readjustment, should cause rubbing of his eyes. In all the epochs of changing history there has existed the small firm minority unable to see the deep implication of contemporary events, and now again, as always before, we meet the same opposition to reform. To most of us it is strange that they can contemplate and admit the upheaval and overthrow of so much that has formed the systems and customs and institutions of our lives hitherto, and yet be unable to see that the small world of medicine cannot escape its own share of similar disturbance.

We, as a people, are in the grip of massive events, and whether we like it or not, we as doctors shall be compelled, by forces far stronger than we can control, to re-adapt the whole of our system to the new social pattern. A readiness, first to see, and then willingly to

1. *Lancet*, 1940, **1**, 736.
2. Abdelsamie, L. *Ibid*, 1936, **1**, 187.
3. *Surgery (U.S.S.R.)*, 1940, No. 4.
4. *Soviet Med. (U.S.S.R.)* 1940, No. 56.

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coöperate in re-adjustment in accordance with the demands of the changing world will ensure high justification for the profession, and service for the people. But a refusal to coöperate in the new form of social life which will soon emerge from the fire of war will impair the driving energy which medicine could employ in building an age of health, perhaps unimagined by the blinkered vision of today.

This is not the place to describe or even suggest in detail the form of a new medical service. The general principle, which must arise from a totally new outlook on health, must come before the detail. The characteristic activity of this closing medical epoch is its emphasis on the treatment of existing disease. We wait and watch for disease to appear, ready to devote ever-increasing knowledge and skill to its cure. The idea of health as a form of beauty and necessary for physical, moral and even spiritual exhilaration, scarcely enters into our thoughts. We do not yet regard the large mass of illness with a sense of social shame as we look on material ugliness. Complacently we see ill-health and sub-health around us as a necessary evil, but a new consciousness of the scandal of preventable disease would turn our energies into the direction of prophylaxis and the final eradication of the fundamental causes of ill-health, whether they be social or individual.

Those who are soon to consider a scheme for the "Future of Medicine" will have to concern themselves with far more than the details of conditions of practice, hospital politics, and other similar items which form the body of most suggestions for a medical service. Medicine must first proclaim the futility of employing most of its energies in treating end-results, and put forth a new enthusiasm for prevention, by an attack on all the many fundamental social evils out of which so much disease arises. It must teach the ideal beauty of health and the ugly cruelty of disease. Concentration on the paramount necessity of prevention must be the characteristic of the new world which is coming. The new emphasis on positive health will afford medicine a place of dignity and opportunity for service in the state second to no other. Let us see to it that we shall be ready.

London. ALECK BOURNE.

ASCORBIC ACID AS AN INDEX OF NUTRITION

SIR,—I feel I owe Dr. Leslie Harris some apology; his article on ascorbic acid as an index of nutrition was confined to this subject and his context did not refer to other criteria. I was therefore wrong to accuse him of making this criterion the "sole" one of dietetic adequacy. But his criticisms of my doubts as to the necessary amounts of ascorbic acid required to maintain good health and to prevent scurvy are not radically satisfactory. He brings forward the very prolix article of W. Stepp and H. Schroeder (*Klin. Wschr.* 1939, **18**, 414) in criticism of Rietschel's first experiment (*Ibid*, 1938, p. 1787) that the absence of scurvy did not postulate that health otherwise was good. Of the two later experiments which especially tended to show that scurvy was absent and that health was excellent Stepp remarks in a footnote that he had nothing further to add. I doubt too the validity of his stricture that recent political trends in Germany may have orientated scientific research; after all, he accepts Stepp's evidence in his favour. But until these three experiments of Schick, Mensching and Rietschel have been proved fallacious, they should be accepted at their face value.

But I should not have intervened if this German evidence was not supported. Dr. Harris and Dr. Russell Martin both point out that arctic travellers may and do eat large amounts of meat and so may absorb a sufficiency of ascorbic acid even to satisfy the committee of the League of Nations. This may be so or not. Taking 0·75 mg. % as a very liberal flesh value for ascorbic acid (muscle 0·5 to 1·0, fat nil, viscera 2, brain 4 mg. %), to obtain the alleged optimum, in view of the fact that much fat was eaten, they would have to ingest over 4 kg. or 9 pounds of flesh daily; the records show that they actually ate a little over 1 kg. More disturbing is the analysis of the treatment of active scurvy by fresh meat as practised by Dr. Grieve at Harbour Bar, Labrador (1909–11). In the treatment of scurvy with ascorbic acid large doses are used, 100 to 200 mg. daily or oftener. To get these amounts in the meat cure, he would need to prescribe 14 to 28 kg. of flesh each day. It is quite impossible to believe that a subject of scurvy with his sore mouth, loose teeth and anorexia would be able to ingest even 1 kg. a day. He also states that experiments such as I suggested have already been carried out; if so they have escaped my observation. I have seen many accounts of experiments chiefly on children previously fed on irrational and usually inadequate low-class diets which then were supplemented with milk, cod-liver oil, &c. This is not what I suggested. Let varied, but adequate, diets be compared.

I have pointed out that there is evidence that diets almost completely lacking in vitamin C are yet consistent with good health and immunity from scurvy; secondly, that active scurvy may be successfully treated by a diet in which vitamin C is scanty. Can we reconcile the different viewpoints? Scurvy would appear to be due to two main factors: (*a*) mild catarrhal infections, especially of the respiratory tract, and (*b*) toxic substances engendered in the preparation or preservation of foods which prevent optimal protein metabolism as regards hæmatopoiesis and vascular stability. Ascorbic acid in excess appears to be able to neutralise this (*b*) factor and so prevent or cure scurvy. The German experimenters and the arctic travellers escaped scurvy and maintained good health by avoiding this (*b*) factor and Dr. Grieve cured scurvy in the same way.

It follows that Dr. Leslie Harris and the League of Nations' committee advise diets rich in vitamin C so that undetermined toxic elements in the dietary shall be neutralised. Hence my objection to it being a criterion of dietetic adequacy. It is a primary rule in toxicology that it is wiser to prevent the ingestion of poison than to make the antidote available.

Bristol, 8. A. T. TODD.

VIRUS DISEASES ACQUIRED FROM ANIMALS

SIR,—Professor Bedson in his interesting address published in THE LANCET of Nov. 9 (p. 577) states that indubitable human infections with Rift Valley fever have been confined to laboratory personnel. It should, however, be recalled that in Kenya, during epizootics of Rift Valley fever in sheep, Daubney and his co-workers have noted on more than one occasion attacks of febrile illness among shepherds and others in close contact with infected flocks. Immune bodies to Rift Valley fever virus have subsequently been found in the sera of these persons. In addition immune bodies to Rift Valley fever virus have been found in the sera of natives from Uganda, the southern Anglo-Egyptian Sudan, French Sudan and French equatorial Africa, but not from the west coast of Africa (*Bull. Soc. Path. exot.* 1936, **29**, 986). There is of course no evidence that under natural conditions men have been directly infected by animals suffering from the disease, but neither is this evidence available in the case of equine encephalomyelitis. In both diseases infection is apparently spread both to animals and man by insect vectors.

G. M. FINDLAY.

Wellcome Bureau of Scientific Research, London.

A SALVAGED UTERUS

SIR,—One day last week a medical officer brought me a uterus which appeared to have been removed by the usual surgical method. Except for some discoloration of the vaginal cuff, there was nothing to distinguish it from the result of any total hysterectomy. The agent, however, was different. The specimen had been picked up by salvage men sorting the debris from an Anderson shelter which had housed two women when struck by an aerial torpedo. Other remains were few and fragmentary, and were hardly to be distinguished from the earth in which they lay. Of all the soft parts this uterus alone remained intact, its survival being probably due to the reinforcing effect of several small interstitial fibroids. The interest lies in the extraordinarily close resemblance between the action of blast and of surgery, the orthodox reflections of peritoneum and the clamping of the fallopian tubes having been faithfully reproduced by the explosive force.

My thanks are due to Dr. H. R. Segar, medical superintendent of this hospital, for permission to report this case.

Wellhouse Hospital, Barnet. E. M. MARTLAND.

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THE CHEAP MILK SCHEME

SIR,—Members of the medical profession have warmly welcomed the milk scheme of July 1940 because it represents a very real advance in our social legislation, the more noteworthy since it has happened in time of war. Perhaps the main implication of the scheme is that the Government now accepts a special responsibility for the nutritional care of the mothers and young children as such. There is wisdom in this appreciation of their value to the nation and the special care they require. The Children's Nutrition Council has always pressed for such a policy and views it with satisfaction. This satisfaction must, however, be tempered by an appreciation of certain facts.

First, coincident with the presentation of the scheme there was a rise in the price of milk in Scotland from 3*d.* to 3½*d.* per pint, and this was later followed by a further rise to 4*d.* per pint. Secondly, since only 8% of the population are eligible for the scheme, it follows that 92% are paying considerably more for this milk than previously. Past experience has shown that such increase in price means decrease in consumption. It is hoped, however, that the considerable increase of milk consumption under the scheme will balance the expected fall in the ordinary priced milk. This larger category includes, of course, most of our invalids and convalescents, our old-age pensioners and our adolescents, categories which should be included in any future development of the scheme.

The immediate aim of this letter is to urge a greater appreciation and use of the scheme as it stands. We appeal to practitioners, and especially to Scottish doctors, to use their wide contact with mothers and children to achieve, as near as possible, a 100% use of the milk scheme. It is of interest to notice and compare the acceptance of the scheme in different parts of Great Britain on Sept. 11. In England 67% of possible users were in the scheme; in London 86%; in Scotland 42%; in S.E. Scotland 54% (more recently 70%); in Edinburgh 60% (more recently 70%); in Glasgow 44% (more recently 55%). In view of the importance of milk consumption as a public-health measure, we in Scotland cannot be gratified at our slowness in achieving a fuller use of the scheme. Do the figures mean that the coördination of our public-health services is less advanced than it is in England? The fact that our infantile mortality rate stands at a figure lamentably higher than that for England may well be linked up with such factors.

Our council therefore appeals to the doctors in Scotland to coöperate to the fullest extent with the Government milk officers, who will gladly supply copies of the application form. The administrators of the scheme are anxious to stress the fact that, while the free milk is for people of certain income levels, the cheap milk at 2*d.* a pint is meant for the use of all expectant mothers and children under five irrespective of income, and that it is a citizen duty to use and encourage its fullest possible use.

ERIC F. DOTT,
Chairman.
J. LIPETZ,
Secretary.

Children's Nutrition Council (Edinburgh Branch).

THE MEDICAL PLANNING COMMISSION

SIR,—Recent correspondence indicates that there is general agreement, at any rate among the consultant section of the profession, that the panicky measures regarding the E.M.S. taken by the Ministry of Health at the outbreak of war—upon the advice, as the 8th report from the Select Committee of National Expenditure demonstrates, of the Central Emergency Committee of the B.M.A.—are indeed a "direful spring of woes un-numbered," both to the profession and to the public. It is therefore I think important to point out, especially to my fellow-consultants, that there is now a movement by the B.M.A., which has already made considerable advance, to establish a "Medical Planning Commission" to consider important problems of reconstruction and reorganisation in the field of medicine in the post-war era. The sense of proportion displayed by those responsible for this movement may be illustrated by two recent acts. The Parliamentary Medical Committee, comprising some round dozen members of Parliament who happen also to be registered medical practitioners (and I am at the moment the only member of this committee holding consultant status) was invited to appoint two representatives upon this commission. I understand that the Royal College of Physicians of London, with a roll-call of over 300 fellows, was also invited to send two representatives.

Unless consultants are more watchful now than they were a year ago they may, I submit, find themselves again the victims of the irresponsible action taken by a body which is grossly unrepresentative of their interests. May we not also hope that the Royal Colleges in London, which I think are rightly regarded as the official guardians of the interests of the consultant section of the profession, will bestir themselves to make their influence felt, and offer some counterpoise to the claim made by the B.M.A. that it "represents" the profession and that it has the sanction of the Ministry of Health and other Government departments for this more than questionable claim.

Wimpole Street, W.1. E. GRAHAM-LITTLE.

TOXOID IMMUNISATION

SIR,—In his letter of Nov. 9 Dr. Baynton Forge misleads by stating that the official health services disseminate the idea that toxoid immunisation for diphtheria is a "perfectly safe procedure." They stress the fact of its efficacy and point out that the evil effects are small compared to the good done. Some deaths may be ascribed to diphtheria immunisation but these are very rare and when compared to the number of lives saved are relatively insignificant. I am inclined to agree with him on theoretical grounds that the carrier-rate may be increased but whether this actually occurs is another matter. Even though it did it would not be such a great evil in an immunised population, for small latent infections help to maintain the immunity. If immunised people living in a non-immunised population are a theoretical potential danger to the rest, that is a reason why the whole of the susceptible population should be immunised. It is difficult to assess the significance of Dr. Forge's cases because no particulars have been given of the actual toxoid used, technique employed, dates of injections, &c. It would be interesting to know if the swabbing of the carriers was checked by virulence tests, and if his "carriers" were post-Schicked. Most competent authorities would agree that a suitable toxoid, —e.g., A.P.T. for children under the age of nine and T.A.F. for the others—given according to a sound technique should not be lightly discarded in times like the present for vaccines of doubtful value.

Swansea. G. E. DONOVAN.

ONE OR TWO?

SIR,—I congratulate your peripatetic correspondents upon their excellent series of articles, but I must challenge the statement of your correspondent who, in THE LANCET of Nov. 9, maintained that man is striving after unity in his paired organs. Since the days when we were primitive fish we have acquired several new paired organs. When we decided to breathe air instead of water we relinquished our gills and developed two lungs. Our reptilian ancestors were dissatisfied with the mesonephros of fishes and amphibians and replaced it by a new kidney (the metanephros) which is also a paired organ. Our cerebral cortex, of which your correspondent writes at some length, consists very largely of the neopallium, which only began to grow on a big scale in our recent mammalian ancestors. These ancestors were careful to develop the neopallium in duplicate, though admittedly most of us use one hemisphere more than the other. I feel that we should think long and carefully before reversing the policy of our ancestors of having spare parts when possible. I must confess that I do not envy the one-armed crab which is admired by your correspondent. Incidentally, I have a strong suspicion that Naughty Jane and her friends exist in both cerebral hemispheres and cannot therefore be removed by taking away half the cerebrum.

West London Hospital. W. A. ELLIOTT.

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MISUSE OF TANNIC ACID

SIR,—The attack on the use of tannic acid in a leading article last week must come as a surprise to many. I suggest that this so-called failure of tannic acid is due either to the failure of those using it to do so properly or, in the case of hand burns, to the irreparable damage done by the initial burn.

To apply tannic acid to a severe burn and leave it at that is as unreasonable as to expect a mobile joint after an arthroplasty if no after-treatment is carried out. Tannic acid cannot be expected to produce epithelium like magic over a large third-degree burn. Skin grafting will practically always be necessary, but surely this is no condemnation of tannic acid which does most effectively overcome the shock and frequently leaves a granulating surface ready for further treatment; even if sloughs are present I doubt if preliminary tanning *for about a fortnight* has done anything but good. The patient's general condition will have greatly improved and a healthy granulating surface suitable for skin grafting is no more difficult to obtain now than it would have been if tanning had not been carried out.

Turning to burns of the hands one very obvious point which has received no mention is the damage caused by the burn being so great, in some cases, that restoration is impossible by any method. The danger of ischæmia from œdema is readily avoided by confining tanning to the anterior and posterior surfaces of the fingers until tissue swelling has subsided. Thereafter complete tanning may be carried out with satisfactory results. Contractures must be combated by splinting, skin grafting and movements if tannic acid is used, as with any other treatment, but if they occur it is the fault of the surgeon, not of the tannic acid.

The heading "Misuse of Tannic Acid" is more appropriate than the text of the article. Many surgeons who regularly treat burns with tannic acid obtain as good results in burns of the hand and face as elsewhere. To them such dogmatic phraseology as "tannic acid must never again be used for burns of the hand and face" seems strangely out of place.

London, E.9. W. D. PARK,
Surgeon, E.M.S.

PATHOLOGISTS AND THE E.M.S.

SIR,—As some of your correspondents are bringing to light instances of the unsatisfactory way in which present E.M.S. salary arrangements may work in practice, may I call your attention to the anomalous position of many of the pathologists on the staff of London voluntary hospitals? They, of course, signed a contract similar to that referred to by Dr. F. W. Roberts in your issue of Nov. 9. For nearly a year they carried out the laboratory work for many E.M.S. cases, organised local blood-donor panels, collected blood for storage, and were responsible for transfusion equipment. Soon after air-attacks on London began, and casualties in large numbers arrived, their contracts were suddenly terminated. Their E.M.S. work in connexion with transfusion and civilian war wounds had nevertheless to go on, and on inquiry they learned that their own hospitals were henceforth responsible for their remuneration. This might have made no material difference to them in peace-time if their appointments to those hospitals had been full-time ones and remunerated accordingly; actually many London pathologists who in signing their E.M.S. contracts resigned outside appointments and gave up private practice now find themselves back on part-time honoraria, yet taking full-time hospital responsibilities and having no means of making good the financial deficiency. Meanwhile, their colleagues, in some cases more junior men who originally happened to be posted to sector hospitals outside London, continue to draw their E.M.S. salaries.

The difficulty appears to be to bridge the gulf between the voluntary-hospital system of paying nominal salaries and allowing other institutional or private work and the E.M.S. system of higher salaries and full-time posts. Apart from the anomalies mentioned, the present position of the late full-time E.M.S. pathologist also implies that, if a London voluntary hospital now happens to be put out of action, he and the pathological staff are thrown out of work. The remedy of simply transferring the pathologist from a London to a sector hospital defeats the ministry's object of saving public money. If the Ministry of Health have to reduce expenditure connected with E.M.S. pathological services it would surely be fairer for them to allocate a lump sum for pathological services within the whole sector, including the metropolitan area where casualties are likely to be the heaviest, rather than to victimise those pathologists whose services are required in the London area. The voluntary hospitals could be made to share their burden of the cost by refunding to the ministry sums equivalent to the pre-war salaries of their pathologists.

London. PLASMA.

COMPULSORY IMMUNISATION

SIR,—I am sorry that I for one cannot endorse Dr. Cunningham's plea for compulsory immunisation against such diseases as diphtheria (for all healthy school-children), the typhoid group (for heavily bombed areas), smallpox, and tetanus (for members of defence forces, &c.). I think that few medical men whose experience goes back rather further than Dr. Cunningham's, and who realise the intense opposition which compulsory vaccination aroused in many quarters at the time when a real attempt was made to make vaccination compulsory, would wish to see this country involved in a similar undignified and fruitless controversy and struggle. That it would fail in its object is almost a foregone conclusion.

As regards diphtheria, Dr. Cunningham must surely be aware that merely to immunise the child population of school age—even if one hundred per cent. could be immunised by any system of compulsion—would admittedly fail to prevent serious epidemics of the disease, so that it would certainly be necessary to include the children of pre-school age. In any case, it is very doubtful whether as large a proportion of children could be immunised under any compulsory system as is now quite possible under an efficiently conducted voluntary system. As for vaccination against smallpox, Dr. Cunningham must indeed be an optimist if he thinks compulsory vaccination would be a success; and on what grounds and for what reason would he propose to make it compulsory?

I cannot imagine any measure (if a serious attempt were made to carry it out) more calculated to bring every kind of immunisation into disrepute than that which Dr. Cunningham suggests.

Leicester. C. KILLICK MILLARD.

SNAPS FROM THE SURGEON-GENERAL'S LIBRARY

MORE than a year ago we said that the better dissemination of scientific information was an urgent problem.[1] Today it is equally urgent but much more difficult, and it is good to hear that a group of friends of the Army Medical Library at Washington have set up a microfilm service there which will make the important collections of the library readily available to research workers who are unable to visit it. The new "Medicofilm Service" will supply photographic copies on cinema film of any article which the would-be reader chooses. In this country before the war the making of microfilm records was still in an experimental stage, though the publication of J. D. Bernal's "Social Function of Science" had given it a fillip. For the last three years facilities have been available at Washington, but the new service will specialise in medical work and will operate in the Army Medical Library itself. It will be run on a non-profit basis, and the cost of labour and materials will be covered by a charge of 30 cents for each complete article not exceeding thirty pages and 10 cents for every succeeding ten pages. Lists of the 4000 periodicals filed at the library and further information may be had from Microfilm Service, Army Medical Library, 7th Street and Independence Avenue, S.W., Washington, D.C.

1. *Lancet*, 1939, 1, 765.

The medical college of the London Hospital is to be established at the Essex County Hospital, Colchester. Dr. S. A. Propert, hon. physician to the hospital, has been appointed dean's representative there.

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Parliament

THE House of Commons is always at its best when paying tribute to the qualities and gifts of distinguished members who have passed from its midst. Neville Chamberlain in the latter part of his career was fated to be the storm centre of controversy, but by his death all criticism was stilled and all parties combined to pay their respects to one who was universally recognised as a man of honour and a sturdy patriot. Mr. Churchill has never been more eloquent than in the brilliantly phrased appreciation of his predecessor, uttered with deep feeling which much impressed the House. He summed up both the greatness and the tragedy of Mr. Chamberlain's life when he said that he had striven hard against events which had nevertheless contradicted him. He had been disappointed in his hopes and had been deceived and cheated by a wicked man. But those hopes and wishes, and the faith which had been abused, were surely the most noble and benevolent instincts of the human heart —the love of peace and the pursuit of peace, even at great peril and certainly to the disdain of popularity or clamour.

* * *

No social experiment in recent years has aroused more interest among members of the House of Commons than the camps scheme. Mr. Malcolm MacDonald was able to give members a satisfactory assurance that in spite of war-time preoccupation considerable progress is being made with the plan. There are now 31 camps in England and Wales, almost all of which have been completed. These have been occupied since the middle of the summer. One camp has been let to the War Office because it is unsuitable for occupation by school-children, another is occupied by an orphanage, and a third is being used as a school for cripple children. The other 28 camps have been let to local education authorities and are occupied either by individual schools or composite schools or composite schools created for the purpose made up of children from cities and towns in the evacuation areas. There are 6,000 boys and girls in the camps, but that number does not represent the total accommodation and the Board of Education are taking steps to fill the camps completely. The general results of the camps enterprise, said Mr. MacDonald, had been wholly good, and it was one of the most significant pieces of work that Parliament had lent its hand to in recent times. Not only were the children safer from Nazi airmen but they had gained permanent benefits from their sojourn in the fresh air of the country.

In the House of Lords the Workmen's Compensation and Benefit (Byssinosis) Bill has been read a second time.

QUESTION TIME

Release of Internees on Medical Grounds

In reply to a question Mr. O. PEAKE, under secretary to the Home Office, said: When it is decided to release a married man from internment it is the practice to consider the question of releasing his wife if she also is interned, but as the women who are interned are all in either category A or B, there are in many instances objections on security grounds to their release. Not all the married men released on medical grounds need nursing, but any representations made by the camp medical officers would of course receive careful and sympathetic consideration.

Medical Examination of Air-raid Wardens

Lieut.-Commander G. BRAITHWAITE asked the Home Secretary whether persons volunteering for duty as air-raid wardens were subjected to a medical examination before acceptance, observing that the widow of the late Herbert Pinder, air-raid warden, of Skeffling, Yorkshire, had been refused a pension on the grounds that her husband's death at his post was due to heart failure caused by the explosion of enemy bombs.—Mr. HERBERT MORRISON replied: It has not been considered practicable to require volunteers for the wardens' service to submit to medical examination, nor has experience shown that any general rule of this nature is necessary. I have no information with regard to the particular case mentioned, which would appear to be a matter for the consideration of the Minister of Pensions.

Disability Pensions

In answer to a question Sir W. WOMERSLEY said: Comparatively few awards of pension have yet been made by the Ministry, and those actually in issue at the present time are of varying rates suited to the immediate condition of each case, and so for the most part do not represent the ultimate pension that may be found proper.

Central Medical War Committee

Mr. T. E. GROVES asked the Minister of Health if he would state the names of all members of the Central Medical War Committee appointed by him or his predecessor in addition to, and not included in the list of, the names submitted by the Central Emergency Committee of the British Medical Association; and, in order to make it fully representative, would he now appoint members of the Medical Practitioners Union.—Mr. M. MACDONALD replied: The names asked for in the first part of the question are Dr. J. Alison Glover, representing the Board of Education, and Sir Hubert Bond, representing the Board of Control. The answer to the second part of the question is in the negative.

Our Reinforced Loaf

Mr. W. LEACH asked the Parliamentary Secretary to the Ministry of Food whether he would forbid the adulteration of white flour with calcium salt and a synthetic vitamin until the House of Commons had had an opportunity of discussing the matter, especially as a large number of doctors were entirely opposed to the proposal.—Major LLOYD GEORGE replied: The decision to introduce a calcium salt and synthetic vitamin B_1 into flour was reached by the Government after receiving a recommendation from the Scientific Food Committee, of which Sir William Bragg, P.R.S., is chairman. The Minister cannot admit the implication in the first part of the question, and he is unable to give the undertaking asked for.

Sir ERNEST GRAHAM-LITTLE asked whether, in view of recent experimental research at the Lister Institute demonstrating the nutritive superiority of wholemeal flour tested against white flour reinforced with synthetic vitamin B_1 he would consider the Government's decision as to the provision of a war loaf.—Major LLOYD GEORGE: The Minister is aware that a high-extraction flour has some points of superiority from the nutritional point of view over white flour reinforced with synthetic vitamin B_1. The reasons for the Government's decision to reinforce white flour while securing that wholemeal flour is also available to the public were explained to this House on July 18, and the Government sees no reason to reconsider the decision then announced.

Provision of Milk

Mr. R. W. SORENSEN asked whether he was aware of a shortage of milk-supplies in certain home county areas to which women and children had been evacuated; that this might adversely affect the health and domestic needs of all now living in those areas; and whether he would take measures to secure that milk supplies were made adequate according to the transfer of population from London to other areas.—Major LLOYD GEORGE replied: I am aware that temporary shortages of milk supplies have occurred in certain areas to which women and children have been evacuated. Under the system of control additional supplies are directed to such areas as the need arises, and in the majority of cases the shortage is of only two or three days' duration.

Mr. DAVID ADAMS asked whether he was aware that certain local authorities were, by advertisements in the public press and by the issue of handbills, warning those entitled to cheap or free milk under the National Milk Scheme that they would get the best and safest milk by the purchase of pasteurised or tuberculin-tested milk; and, as it was equally desirable that all other consumers of this food should enjoy similar protection, what steps he was taking to secure this.—Major LLOYD GEORGE replied: The answer to the first part of the question is in the affirmative. As regards the second part the Minister sees no objection to local authorities informing any section of the public of their opinion on the qualities of milk of various types, and he has himself issued a general statement to the effect that maximum protection against the present special dangers of infection which may exist can be obtained by the boiling of milk which has not been pasteurised or sterilised.

Cod-liver Oil and the Purchase Tax

Mr. W. LUNN asked the Chancellor of the Exchequer if he was aware that cod-liver oil was included in the taxable articles under the purchase tax; and, in view of the low butter ration and its necessity in respiratory diseases, would he make it clear whether cod-liver oil was classed as a drug or a food.—

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Sir KINGSLEY WOOD replied: It has been decided that purchase tax will not be chargeable on sales of cod-liver oil, cod-liver oil and malt, and simple emulsions of cod-liver oil. [We understand that halibut oil is also exempted.]

Sugar for Munition Workers

Mr. A. DENVILLE asked the Parliamentary Secretary to the Ministry of Food, whether, in view of the scientific findings as to the energy-producing properties of sugar, and the demands for confectionery among munition workers of both sexes, he would increase and maintain the supply of confectionery to canteens and, in particular, to retailers in munition areas.—Major LLOYD GEORGE replied: Arrangements are in operation for ensuring that priority is given to the reasonable requirements for canteens serving workers engaged on essential production. Distribution of confectionery to retail outlets is regulated by the industry, but consideration is given to movements of population and to the needs of different districts.

Obituary

CHARLES WILLIAM MANSELL-MOULLIN

C.B.E., D.M. OXFD, F.R.C.S.

Mr. Mansell-Moullin, consulting surgeon to the London Hospital, who died on Nov. 10 at the age of 89, was one of the last remaining members of the brilliant band who were educated at Oxford when there was still no medical school there and the humanities were held to be at least as important as a knowledge of physic. Most of them became physicians, a few surgeons, but all bore the stamp of their early training in graciousness and culture.

Elliott & Fry.

Mansell-Moullin was born in Guernsey, the second son of Dr. James Moullin who practised on the island. He was educated privately and entered Pembroke College, Oxford, in 1868, gaining a second class in classical moderations and a first class in the final school of natural science in 1872. He was elected to the medical fellowship at Pembroke and was an examiner in biology at the final school, while the Radcliffe travelling scholarship enabled him to visit Vienna, Paris and Strasbourg. For his clinical training he went to St. Bartholomew's Hospital, where he graduated B.M. in 1876. He held house-appointments and acted as assistant chloroformist at the hospital. Two years later he obtained his F.R.C.S. and in 1879 his D.M. degree for a thesis on the pathology of shock. He then went to the London Hospital as surgical registrar and in due course was elected to the honorary staff. His appointment as lecturer in surgery at the medical college followed. He was a sound practical teacher who inspired loyalty and affection in his house-surgeons and dressers to whom he and his wife gave generous hospitality at their house in Wimpole Street. A surgeon describes him as a rapid operator and recalls an occasion when he was performing an orchidectomy. The anæsthetist had a little difficulty in getting the patient under and said "He will be ready directly, Sir." "Thanks—I have just finished" said Mansell-Moullin who was in fact inserting the last suture. His surgical work falls into three periods. At the beginning he was interested in genito-urinary surgery, and his Hunterian lectures in 1892 were on the operative treatment of enlarged prostate, expanded later in a book which ran into four editions. Then he turned to the stomach and appendix, and even in 1900 could show excellent results from gastro-enterostomy. He often operated for gastric hæmorrhage and in 1902 published a book on the surgical treatment of peptic ulcer. From 1910 onwards he became absorbed in the origin of carcinoma and his Bradshaw lecture in 1912 and second Hunterian lecture in 1914 were on the biology of tumours. Double cataract restricted his activities towards the end of his life, but his interest in cancer remained keen and even during the last five years he was writing about it.

He served on the council of the Royal College of Surgeons from 1902–15 and was at one time a vice-president. He examined in surgery for the universities of Cambridge, Glasgow and Oxford. He early became interested in radiology and in 1898 was elected the second president of the Roentgen Society. During the last war he was attached to the Second London General Hospital with the rank of colonel R.A.M.C. (T.), and was decorated C.B.E. in 1919.

He married Edith Ruth Thomas with whom he worked untiringly to secure for women the right to be trained as doctors. Both he and his wife were prominent supporters of the suffragette movement and in 1912 he was one of those who signed a report in our columns on the forcible feeding of suffrage prisoners. Mrs. Mansell-Moullin survives him with one son, now serving as a flight-lieutenant.

NORMAN FRANCIS CLIFFORD BURGESS

M.D. CAMB., M.R.C.P.

ON Oct. 18 Dr. Norman Burgess died in Bristol after a long illness. He was the son of Councillor F. J. Burgess of that town and he was educated at Clifton College and Caius College, Cambridge, where he was an exhibitioner. He qualified from Guy's in 1926 and travelling scholarships allowed him to continue the study of dermatology, which he had already chosen as his specialty, in Paris and America, where he held an externeship in the skin department of the Graduate Hospital at Philadelphia. Soon after his return to Bristol he was appointed chief surgeon to the Bristol constabulary and before he resigned in 1936 he introduced many of the more modern methods of scientific inquiry in criminology. In 1929 he became assistant physician to the skin department of the Bristol General Infirmary and in 1932 he succeeded Dr. Kenneth Wills as physician in charge of the department. He was also on the honorary staff of the Southmead, Homœopathic and Cossham Hospitals. He was lecturer in skin diseases at the University of Bristol. The high standard of his work was soon recognised in the West country and he was an enthusiastic and popular contributor to the meetings of the dermatological associations. He had published work on autohæmotherapy and on the treatment of lupus vulgaris and his practical contribution on this subject was well received at the International Congress of Dermatology held in Budapest in 1935.

In 1937 Burgess was appointed county commissioner of the St. John Ambulance Brigade and in recognition of his work for this organisation he was elected an officer in the order of St. John of Jerusalem. For many years he had been a territorial officer in the R.A.M.C. and at the outbreak of war he was appointed medical officer to an A.A. brigade but his health failed and he was invalided out with the rank of major.

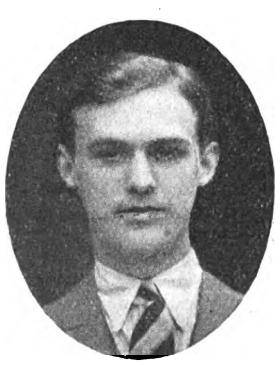
He leaves a widow, a son and two daughters.

ARTHUR GRIFFIN BELLAMY

M.B. CAMB.

PROBATIONARY TEMPORARY SURGEON-LIEUTENANT, R.N.V.R.

THE death of Surgeon-Lieutenant A. G. Bellamy is announced in a list of casualties which have arisen from the various hazards of war and are not connected with any particular operation or ship. Bellamy was born in 1912, the son of Dr. J. H. Bellamy of Ashby, near Scunthorpe. He was educated at St. Lawrence College, Ramsgate, and Selwyn College, Cambridge. He entered St. Thomas's Hospital in 1933 and qualified M.R.C.S. in 1936, and the following year he passed his M.B. degree. He held house-appointments at the West London Hospital and at St. Mary Abbots Hospital, and for a time he was senior resident medical officer at the Royal National Hospital, Ventnor.



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A POSTSCRIPT

Jeffery Ramsay, E. J. Wyler, R. C. Turnbull—obituary notices followed each other in this order in THE LANCET of Nov. 9, all three of them old and personal friends of mine. Ramsay was the most recent, but he was one of those men with whom, at first sight, it was impossible not to establish friendship, and I had three times enjoyed staying with him in his delightful and beautiful home, so surprisingly near Blackburn and Preston and industrial Lancashire and yet so remote amongst its moors and hills. The atmosphere of his home radiated hospitality and happiness. Had I been a patient, I could have wished my doctor to be Ramsay. Wyler was a Jew and proud of it, but always maintained that he was none the less an Englishman and proud of that. He won his M.C. and lost his leg in the first few weeks of the war in 1914. Although he had retired and had no particular reason for living in London, he told me, the day before his death, that he could not be happy away from it, as things were, and we had arranged for a little medical work that he could do. He also borrowed from me on that same day—his last, as it turned out—a book on art; he spent hours studying pictures and saw almost every show that was put on in London. Turnbull, when we were both medical students, was the first man with whom I shared independent digs in London, and the first man, owing to his own enthusiasm, who created in me a love of poetry. He was also the first man, both of us entirely ignorant of the art, with whom I spent a fly-fishing holiday. Later he became fonder of rose-growing, for which he obtained many championship trophies, and golf. Beneath a somewhat sarcastic exterior he had the warm heart of an idealist and, in his own subject, was probably one of the sanest and ablest alienists in the country. To all three, like many others, I imagine, I owe many debts. May the earth rest lightly upon their ashes.—H. H. B.

Medical News

Royal College of Surgeons of England

At a meeting of the council of the college held on Nov. 14 with Mr. Hugh Lett, the president, in the chair, Mr. Robert Milne was re-elected, and Mr. V. Zachary Cope, Mr. C. E. Shattock, Mr. M. F. Nicholls and Mr. E. W. Riches were elected as members of the court of examiners for one year from Dec. 12.

Diplomas of membership and of public health were granted to the candidates named in the report of the comitia of the Royal College of Physicians in THE LANCET of Nov. 9, p. 610, and a diploma of membership was also granted to J. C. Day of St. Mary's. Licences in dental surgery were granted to the following:

E. M. Babington, F. E. Barlow, A. E. Baxter, J. B. Bell, O. R. Berry, H. H. Brown, R. W. E. Bynoe, B. D. Clark, R. M. Courtier, H. L. P. Cullingford, Nicholas Dalton, D. K. L. Davies, D. W. A. Drew, Margery E. H. Eames, Lionel Flax, Marjorie R. Ford, A. C. G. Freer, D. L. Gabb, F. H. Glass, R. C. Green, Norman Hardy, D. S. G. Leggett, W. G. Morgan, D. C. New, J. A. Orchover, Peter Packer, R. L. Partridge, E. M. Poole, F. F. Robson, Lily Rosenbaum, G. W. Sawyer, S. N. Simpson, R. G. M. Stobie, B. P. Taylor, C. H. Vigar, J. A. Winwood, Derek Wright and P. F. M. Young.

University of Wales

At recent degree examinations in medicine at the Welsh National School of Medicine the following were successful:

Mary E. Budding, Enid Curran, A. B. J. Hill, J. E. Lloyd, Stanley Love, J. W. Morgan, D. G. Morris and K. M. Wheeler.

Health Services for Evacuees

The Minister of Health asks that the local welfare services which are already available to those evacuated under Government schemes should if necessary be extended to include all evacuated and homeless people in the area. The minister considers that hospital treatment, accommodation for infectious diseases, maternity cases and welfare services for the blind should be available to evacuees on the same terms as to local residents. He suggests that reception areas may find it possible to borrow staff from evacuated areas and proposes that sick bays should be provided for minor ailments which need not then occupy hospital beds to the exclusion of more acute cases.

Army Casualties

The following casualties in the R.A.M.C. are announced:

Prisoner of war—Lieutenant Ferdinand Duval, M.B. Sydney; Captain J. R. Heslop, M.B. Durh.; A./Major C. H. Imrie, M.B. St. And.; Major W. L. Kinnear, M.D. St. And.; Lieutenant N. E. Monteuuis, M.B. Camb.; Lieutenant William Siller, M.B. Glasg.; W.S./Captain J. R. S. Third, M.B. Aberd.

Previously reported missing, now reported prisoner of war—A./Major Edward Davies-Thomas, M.R.C.S.

Manning of Mobile Units

The Minister of Health considers that it is no longer desirable to insist on the automatic attendance of a doctor at a mobile unit each time a red warning is received. In future it will be sufficient if he is summoned from the control centre when his services are needed. But in populous areas which are being constantly bombed one mobile unit should be completely manned on the receipt of a red warning.

At the Royal Society of Medicine, 1, Wimpole Street, W.1, the section of odontology will meet on Nov. 25 at 2 P.M. when Mr. Warwick James and Mr. B. W. Fickling will read a paper on the structure of the bones of the face in relationship to fracture and other aspects of facial injuries. On Nov. 26 at 2 P.M. at the section of medicine Dr. F. G. Chandler, Dr. Clifford Hoyle and Mr. George Mason will open a discussion on the treatment of traumatic hæmothorax. On Nov. 30 the section of orthopædics will meet at Hill End Emergency Hospital, St. Albans, at 11 A.M. Mr. S. L. Higgs will open a discussion on the closed plaster treatment of wounds in the light of recent experience, and Mr. Rainsford Mowlem a discussion on the treatment of burns.

For the present all communications to the National Radium Commission should be addressed to the secretary at East Cottage, Petty France, Badminton, Glos.

The Medical Society of London will hold a pathological meeting on Nov. 25 at 2.30 P.M. at 11, Chandos Street, W.1.

On Nov. 18 Dr. G. L. Wilkinson (Middle Temple) was called to the bar.

Dr. D. A. K. Black informs us that the desoxycorticosterone acetate used in the experiments reported in THE LANCET of Nov. 16 (p. 618) was supplied by Messrs. Ciba. The abbreviation D.O.C.A. is the trade mark of another firm.

A NEW HIGH-TENSION GENERATOR

MESSRS. WATSON have put on the market a two-valve transformer, the Roentgen II generator; the valves ar oil immersed and therefore immune to changes in atmospheric conditions and to mechanical damage in the pre-war sense. The valves may be inspected through glass windows in the top of the transformer container. The unit is designed to operate two diagnostic tubes with up to three foci. By means of the straight-line automatic control the output of the tube in use remains constant, irrespective of mains fluctuation and of variation in the line resistances. Thanks to an interlocking system of the time, kilovoltage and the tube in use at the moment, overload of the tube beyond its safe limit is impossible. A good range of kilovoltage and milliamperes is at the disposal of the operator and a consistent output ensured. The main switch is incorporated in the control table, and the change over from one tube to another is operated by a control handle on the transformer cabinet. The switch itself is mounted inside, where it can be easily inspected and cleaned. The room-lights can be operated from the control table. Radiographic exposures are operated by a hand-switch and change over to screening is effected by a foot-switch, which, automatically adjusts the current to the screening setting and also controls the red room-lights. The transformer cabinet has a base 39 in. by 39 in., and is 73 in. high; the control table is 44 in. high, with a base 25 in. square.

A pre-reading kilovoltmeter, with values for the studs on the controls, would probably have been better than a calibration chart. Most radiographers would soon cease to consult the chart, and any inquiry as to what penetration had been used for a particular patient could be met with the reply "Stud 7." The extract from standard exposure times appears optimistically short. The apparatus would be suitable for a private installation or for a hospital with about 100 beds.

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SHELTER HYGIENE

RECOMMENDATIONS OF THE HORDER COMMITTEE

ON Tuesday the recommendations of the Horder Committee on conditions in air-raid shelters, together with an account of the steps taken by the Government to implement them, were published as a White Paper (Cmd. 6234, 2*d.*), and on the wireless in the evening Lord Horder explained their implications and urged swift action. The committee was appointed by the Ministers of Health and Home Security on Sept. 14 and more than half of the recommendations now published were in the ministers' hands by Sept. 18. The remainder have been made at intervals up to Nov. 12, and others will be made as required.

The first seven sections contain suggestions for mitigating what the committee call the crux of the problem—overcrowding. Some of these remind us how rapidly events have moved in the last two months. For instance, section 5 puts forward the possibility of using the tube system for shelter during the night. The committee urged the need for the popularisation of domestic and surface shelters by publicity and demonstrations; for lights and bunks; for the allocation of surface shelters to specified residents; for a re-survey of shelter accommodation in basements, railway arches and the like, and the requisitioning at night of factory and commercial shelters only used by day; for the evacuation of the aged, infirm and bedridden and of children under five, and vigorously pushing on with other evacuation schemes. The White Paper points out that some 4000 aged and infirm people frequenting the London shelters have already been transferred to E.M.S. hospitals in the country, and that, in addition to the extension of the evacuation scheme to mothers with children of school age or under, 4500 unaccompanied children under five have been sent to residential nurseries and 1500 more to billets in the country.

Next the committee proposed the appointment of whole-time paid shelter marshals, a number of whom are now at work in London and elsewhere. They also pressed for adequate sanitary equipment with extra staff for keeping them and the rest of the shelters clean; the White Paper says that instructions have been given that this should be done. In sections 10–12 the committee recommended regular inspection of shelters by the M.O.H. and his staff, provision of first-aid points in large shelters, and posting up of instructions covering ventilation, proper usage, personal behaviour and cleanliness.

Details of medical aid posts are given in section 13.

(*a*) Beds and bunks should be allotted to the medical aid post at the rate of 2 beds and 3 three-tier bunks for every 500 persons in the larger shelters. These bunks should be placed so as to allow expansion of the post if necessary. There should be the same allocation for a group of contiguous smaller shelters.

(*b*) The medical aid post should be large enough to allow of screening off patients for simple medical examination.

These recommendations, with a schedule of equipment and drugs for the aid posts prepared by the committee, are incorporated in instructions issued to local authorities.

VENTILATION, DISINFECTION AND IMMUNISATION

"It is utopian to expect," say the committee," that the standards of cubic air-space per person usually quoted can be fulfilled, at least to begin with." Until the present overcrowding is eased they suggested that in naturally ventilated shelters a standard of 50 cu. ft. per person should be followed, and that the question should be reconsidered later. They urged the full use of whatever means of ventilation exist, specific instructions being issued to shelter marshals, and they say that a dominant factor making for general discomfort and air-pollution is the presence in the shelter of closets; they recommended that wherever possible the men's closets should be placed outside the shelter proper.

On the closely inter-related questions of ventilation and heating the committee recognise that the ideal solution would be air-conditioning, but they say that since this is not practicable, ventilation by natural means must be assumed. They go on:

It should be an instruction to all shelter wardens to see that ventilation shafts, openings in brick work, and other methods of securing the entrance and exit of air are fully open, including the time of a raid. Efforts should be made to control floor draughts, and in large shelters attempts should be made to admit incoming air at high levels, so as to mix with the warm air.

There are objections to heating the majority of shelters during their occupancy which outweigh the advantages. The use of coal and coke entails dangers from fumes. Gas and electricity are subject to interruptions, and have their own special dangers.

Shelters which are liable to crowding do not require heating, even in winter. Such danger to health as there is in connexion with the temperature of a crowded shelter lies in the possibility of too high, rather than too low, a level. It is the sparsely occupied shelter which presents the greatest difficulty. Here some form of heating during the latter part of the day-time might be considered. This would help to popularise the surface shelters. But it is clear that, in regard to the problem of heating, each shelter must be dealt with on its merits.

Individual expedients are to be encouraged, both in the form of improvised sleeping-bags, hot-water bottles, and/or hot bricks. In the smaller communal shelters the device of a candle under a flower-pot is quite helpful.

Further investigation is being made, says the White Paper, into the possibilities of heating surface shelters.

The committee say "there is sufficient evidence for considering that the risk of air-borne infection may be reduced by spraying the atmosphere of shelters." On account of its easy procurability, cheapness in bulk and intrinsic merits the antiseptic they recommended is sodium hypochlorite in aqueous solution, the spray used ranging from mechanically operated to hand-operated apparatus, according to the type and size of shelter. Provision is made for a spray in the schedule of equipment, and different kinds of spray are being examined by the Medical Research Council.

As to other protective measures, in the committee's opinion the disease most likely to arise in increased incidence as the result of shelter conditions, and against which protection by inoculation is of proved value, is diphtheria, and they urged that local authorities should be encouraged to popularise protective inoculation and that diphtheria toxoid should be supplied free by the Ministry of Health. There is no good evidence, they say, that the supply of vitamins in the form of medicines reduces the incidence of the common bacterial infections, and they do not advise their use in that form.

Tests are being made with masks to prevent droplet infection, and other methods, such as throat-spraying, are under consideration; the use of ultraviolet light and "ultra-Sonics" to reduce infection is not advised. The risks of the spread of body-vermin in shelters will be the subject of further recommendations.

Births, Marriages and Deaths

BIRTHS

ASHTON.—On Nov. 18, the wife of Dr. Gerald Ashton, of Dunstable—a daughter.

CARDEW.—On Nov. 15, at Watchet, Somerset, the wife of Dr. H. B. O. Cardew—a son.

CHRISTIE.—On Nov. 7, at Tuxedo Park, New York, the wife of Prof. Ronald Christie—a son.

MAURICE.—On Nov. 13, at Savernake, the wife of Dr. Timothy Maurice, of Marlborough—a daughter.

RUTTER.—On Nov. 14, in Edinburgh, the wife of Dr. T. E. Rutter—a son.

MARRIAGES

DINGLE—WATT.—On Nov. 15, at Aberdeen, William Thomas Dingle, M.D. of Winnipeg, to Dorothy Mabel Robertson Watt.

DEATHS

ACKLAND.—On Nov. 15, at Bideford, Charles Kingsley Ackland, M.R.C.S.

BENSLEY.—On Nov. 13, at Southsea, Clement Henry Bensley, C.I.E., M.R.C.S., Colonel I.M.S. (retd.).

BUSHE.—On Nov. 16, at Newton Abbot, Erasmus Bushe, M.R.C.S., aged 88.

LOVIBOND.—On Nov. 16, in London, Beatrice Frederica Lovibond, M.B. Lond., aged 67.

PARRY-JONES.—On Nov. 15, at Torquay, Maurice Parry-Jones, M.D. Lond., aged 80.

TAWSE.—On Nov. 12, Herbert Bell Tawse, M.B. Aberd., F.R.C.S., of Nottingham.

TILL.—In November, 1940, by enemy action, Albert Thomas Till, M.B. Edin., D.P.H., D.T.M. & H., aged 40, medical officer of health for Mitcham.

WARD.—On Nov. 13, at Wallasey, Basil Vernon Ward, M.B. Manc.

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Notes, Comments and Abstracts

HISTORY OF HÆMOSTASIS AND THE LIGATURE

IN his inaugural address to students of the Royal Victoria Hospital at Belfast on Oct. 10, Mr. G. R. B. Purce, F.R.C.S., said that the relationship between life and blood was known to primitive man, for blood played an important part in religious ceremonies and mystic rites. The Ebers papyrus of 1560 B.C. told us that the Egyptians used the red-hot cautery to stop bleeding and were familiar with such styptics as lead sulphate, antimony and copper sulphate, but Celsus (A.D. 30) was probably the first writer to mention the ligature. He directed that bleeding vessels should be pulled up, ligated on either side of the injured point, and then cut across. Galen (born in A.D. 131) advised placing a finger on a bleeding point; if the artery were deeply seated, it had to be seized with a hook and ligatured. His ligatures were of Celtic linen, were bought at a shop in the via sacra, and they may have come from Scotland. In medieval times surgeons were concerned about the type of wound gunpowder produced. John de Vigo (1514) taught that they were poisoned and should be purified by the red-hot cautery and boiling oil.

When the supply of boiling oil gave out at the capture of the Château de Villane, Ambroise Paré was forced to rely upon a single emollient dressing for the wounded, and the good results led him to abandon the practice of cauterising wounds. In 1552 he amputated the leg of an officer and used the ligature to check bleeding. He used an instrument called the "bec de corbin" to seize the bleeding points, and he ligated the part en masse. His methods gained no immediate acceptance, probably because the tourniquet was not understood. Narrow bands of cloth above and below the amputation site were used to check bleeding. Morel advanced the use of ligature when, at the siege of Besançon in 1674, he introduced a stick into the proximal bandage, and twisted it to stop arterial hæmorrhage.

By the eighteenth century the tourniquet was firmly established. The ligatures used by Cheselden in England and by Heister in Germany were of waxed thread. The great difficulty was secondary hæmorrhage which it was noticed depended upon the degree of suppuration of the wound and the amount of foreign material left in it. Attempts were made to devise absorbable ligatures. Buckskin was tried in America, and Ephraim McDowall was credited with having used it to tie off the pedicle of ovarian cysts. In the nineteenth century, John Hunter's work on the establishment of collateral circulation after ligature led to its adoption in the treatment of aneurysms. Surgeons such as von Graefe the elder, Roux and Pirogoff, began to undertake major operations, and to meet their needs the modern artery forceps was evolved, of which the Spencer Wells (1872) was the original. In 1868 Joseph Lister ligatured the carotid artery of a young calf with catgut which had been soaked in a watery solution of carbolic, and in 1881 his chromic gut was introduced. He had chosen catgut because it was the only absorbable animal tissue which could be easily obtained. The origin of its name was obscure, for it had never been made from the intestine of the cat, but was obtained from the sheep. It had been used for the strings of bows, harps and other instruments by the Assyrians, Egyptians, Hebrews, Greeks and the Hindus. Galen, indeed, had suggested it as a substitute for linen ligatures, but probably it had not been used before Lister's time because of the danger of its anaerobic contamination.

TIME AND THE WORLD'S FAIR

IGNORING the carping spirit of the man who said "What has posterity ever done for me?" the Westinghouse Electric and Manufacturing Company bequeathed the time capsule to the future at the World's Fair last September. It was an imaginative act carried out with sumptuous scientific precautions. The capsule weighed 800 lb. and contained a microfilm illustrating our times, a microscope to read it by, and directions for constructing a larger reading-machine and a motion-film projector. A dictionary, a multilingual text, a lexicon of idioms, a fountain pen, a tobacco pouch with a zipper, a woman's hat, a tin-opener, various textiles, samples of coal and seeds and many other objects are stored away there to puzzle and entrance archæologists five thousand years our juniors. Mr. David S. Youngholm, vice-president of the company, in his address (*Science*, Oct. 4, 1940, p. 301) spoke of it as a letter to the future and explained its construction. A shell of cupaloy has been set in asphalt, and its central cavity, 7 ft. by 6½ in., is lined with Pyrex glass and filled with nitrogen. The capsule has been laid on a concrete bed at the bottom of a steel-lined well 50 ft. deep; and archæologists are requested to leave it alone until 6939. Of course they may reckon time differently then; but that gives them no excuse. The U.S. Naval Observatory has provided astronomical data from which they can find out and note what year they are living in, like Christians; and this information, with full directions for finding the capsule mathematically, has been printed in permanent ink on special rag paper and sent to libraries and museums all over the world. Some of these records will survive, Mr. Youngholm thinks. But will the capsule? Where Egyptian relics have defied decay this elaborate structure will surely do so too; but what about the archæologists? Will they be able to keep their fingers off it for more than a couple of centuries? And if they do, may not the lion and the leopard keep the courts of Chicago when the time comes? Or perhaps man, continuing his present downward trend, may come on it as a puzzled savage and pull it foggily to pieces. But it is pleasant to hope that a race of sensible fellows, better at managing their affairs than we are, will unearth it and shake their heads over the bad old times. Who can say? Truth and the time capsule both lie at the bottom of a well.

THE ORIGIN OF KINGSHIP

Mr. Andrew Rugg-Gunn holds (Osiris and Odin: the Origin of Kingship. H. K. Lewis. Pp. 182. 8*s*. 6*d*.) that civilisation rests on three bases—kingship, agriculture and religion—and to prove his points he follows a fascinating course from the beginnings of time; through the cult of the life principle, worshipped as an all-pervading nature goddess, and associated with communism and human sacrifice, to the coming of Osiris, the first king, who brought agriculture, and with it the rights of private property, to the inhabitants of the Egyptian delta; who died, and lived again to be their god. From Egypt to Scandinavia is a far cry, but there was traffic between the two in the bronze age, and the link between Osiris and Odin seems clear. There are in Scandinavia many places whose names contain the element Odin, and in these districts, and these only, are to be found remains in the megalithic style of buildings used by the Egyptians. Odin was admittedly a foreigner who came by sea, and with him came Mr. Rugg-Gunn's three foundation stones of civilisation. He carries his argument up to the present day, and deals with the age-old origins of our own coronation ritual. Indeed the book is remarkable for the importance it attaches to ritual, by the aid of which the author claims it is possible to subject the unconscious to spiritual control, and "to receive glimpses of supernal wisdom." Surprisingly, he feels that modern civilisation is threatened chiefly by the growth of feminine ideas, coupled with the standardisation of the male intellect by factory work and other mass influences. Communism he considers to be incompatible with civilisation, but thinks that we may possibly revert to it by way of matriarchy and human sacrifice. The latter part of his prophecy seems to be in a fair way to fulfilment, and the former might make a nice change.

Appointments

BUTTERWORTH, JOAN, M.B. Lond., D.P.H.: asst. M.O.H. for Bristol.
BACON, L. J., B.Chir. Camb., D.P.H.: temp. asst. M.O.H. for Birmingham.
MACKICHAN, I. W., M.B. Camb., D.T.M. & H.: M.O. for Uganda.
RUSSELL, J. F., M.B. Glasg., D.P.H.: M.O.H. for Chorley.

The Radcliffe prize which is open to medical graduates of the University of Oxford will be awarded in March 1941 for research in any branch of medical science. Further information may be had from the secretary of faculties at the University Registry, Oxford.

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ORIGINAL ARTICLES

TRAUMATIC HÆMOTHORAX

BY F. RONALD EDWARDS, Ch.M.Lpool, F.R.C.S.
AND
H. MORRISTON DAVIES, M.Chir.Camb., F.R.C.S.
(*From an E.M.S. thoracic surgical unit and the Department of Surgery, University of Liverpool*)

THE following observations, which are based on a series of traumatic injuries to the chest, not great in number but of varied types, may be of value to others called on to deal with this type of injury. Small perforating wounds only are considered here, but the same observations apply to the later stages of extensive chest wounds.

Hæmothorax is the most common complication of chest injuries in modern warfare, being present to a varying degree in 70% of all cases. Injury to a main vessel will cause almost instantaneous death from this complication, and few such cases will reach hospital alive; but a large number of cases in which a bullet or shrapnel has traversed the more peripheral part of the lung, associated with varying degrees of damage to the chest wall will be admitted. When bleeding takes place from the lung it may soon stop, because the pressure in the pulmonary circulation is low and the pulmonary vessels when torn across easily retract, spontaneously interrupting the hæmorrhage, but bleeding from an intercostal artery, usually associated with fractured ribs, is apt to continue and considerable hæmorrhage results. The pleural cavity reacts to the presence of blood by pouring out fluid which may contain up to 4% of protein.

Two factors are to be considered as the cause of death in cases of hæmothorax—hæmorrhage and compression. In the early stages of a hæmothorax the patient is suffering from hæmorrhage alone. The loss of 3 pints (1700 c.cm.) of blood will produce loss of consciousness in nearly all cases, and death in some. The capacity of a single pleural cavity is, however, much greater than three pints, and consequently the great veins and the opposite lung will not be much compressed unless there is an associated pneumothorax. As a general rule the bleeding, when it comes from the lung, will have stopped before 3 pints are lost. Symptoms of such excessive loss of blood should be regarded, therefore, as indicating the probability of injury to a vessel in the systemic circulation. It is only some 24 hours later that severe compression symptoms start to develop, when the outpouring of fluid from the pleural endothelium may increase the volume of the pleural contents to 5000–6000 c.cm.; the heart is then pushed over to the opposite side, and aeration of the other lung is impeded.

Many cases do not reach either of these extreme states of hæmorrhage or compression, but present their own problems none the less.

RESPONSE OF THE PLEURA TO BLOOD

We have studied the irritative effect of the blood on the pleural endothelium by thoracoscopy. The pleura, both parietal and visceral, is generally reddened and markedly œdematous, with large areas of acute hyperæmia associated with numerous punctate hæmorrhages. A number of subendothelial bullæ are seen, caused by air getting through or between the inflamed endothelial cells, and lying between them and the endothoracic fascia. These bullæ are surrounded by a fine zone of intense hyperæmia, the cause for which is not obvious. They are almost certainly artifacts due to the air inserted to replace the aspirated fluid. Deposition of fibrin from the blood takes place, but massive clotting seems to be rare. The surface of the pleura is covered with shreds of fibrin, which make the surface of the collapsed lung look trabeculated. Organisation of this fibrin can be seen to be taking place, giving the impression that the whole lung will become encased in a mantle of fibrous tissue which will prevent re-expansion. But if the organisation has not gone on too long, the lung has a remarkable power of stretching and breaking down this encasement.

When the fluid from such cases is removed and allowed to stand in a test-tube a clot of considerable size forms, but whether this means that the fibrin from the original blood was only partially deposited, or whether it is due to a high fibrinogen content of the pleural exudate, is not clear.

This intense response of the pleura to the presence of blood may be explained by the fact that although the pleural cavity is lined by an "endothelial" layer of cells it is actually a mesothelium. Its reaction is analogous to that which takes place when blood infiltrates into fibrous tissue or muscle or any other mesodermal structure. Blood in such tissues acts as a foreign body setting up an aseptic inflammatory reaction, and causing a localised outpouring of fluid.

Infection of a hæmothorax is not common; it occurred in 17% of cases in this series. If the penetrating missile is small, if the chest wounds of entrance and exit have self-healed and the lung damage is not severe, then the bactericidal power of the spilled blood—due to its antibodies, macrophages and leucocytes—is sufficient to sterilise the field of trauma. This bactericidal power lasts for a few hours only, after which the blood and pleural exudate form a perfect culture medium, which can easily become infected. An open chest wound, an injury to a large bronchus, or the presence of bits of clothing within the chest will almost certainly cause infection. The presence of the missile in the chest will not necessarily induce infection, since it is generally sterile on entry owing to its heat. Sepsis is much less common with missiles in the thoracic cavity than with similar missiles entering a limb, because anaerobic organisms find the lungs an unsuitable soil for growth, and because of the large amount of blood present. Massive infection causes the blood to clot completely, and large pieces of fibrin can be seen in the pleural cavities of such cases.

The irritative effect of the blood on the pleura produces a considerable rise of temperature, particularly in the preliminary stage of the "pleuritis" and during the stage of outpouring of fluid. The maintenance of this pyrexia is closely associated with the degree of tension of the hæmothorax, as with pus under pressure. The absorption of breakdown products from the blood by the inflamed pleural endothelium is held to be responsible for this, the greater the tension the greater the rate of absorption and the higher the temperature. Reduction of the intrapleural pressure by aspiration to zero or to a negative pressure will nearly always cause the temperature to fall to normal. As the pleural exudate re-forms there is a corresponding rise of tension and of temperature, again relieved almost immediately by aspiration. The pyrexia of a hæmothorax differs from that of an empyema in that with a hæmothorax the rise is maintained both morning and evening with relatively slight constitutional reaction, the patient not appearing toxic. In empyema the temperature becomes swinging, the morning temperature falling to normal or below, and the patient appears extremely toxic with severe constitutional reaction.

TREATMENT

Immediate treatment is that of shock and of the wound. The principle of treatment in severely ill patients is, in the early stage, to give transfusions of blood, and to aspirate the blood from the pleural cavity if it is continuing to collect there. In the later stage (after 24 hours) the patient's circulation is making up for the effects of the hæmorrhage, and treatment should be directed towards relief of the compression by aspiration and by replacing the fluid loss. Plasma-transfusions may be given if the pleural exudate is very large, to compensate for the loss of plasma protein. Open chest wounds should be closed as rapidly as possible. Considerable bleeding may occur externally as well as internally from a divided intercostal or internal-mammary vessel, and if there is evidence of this local exploration of the wound to attempt ligature of the vessel is justified; otherwise no major surgery should be attempted at this stage. Pulmonary bleeding will stop spontaneously

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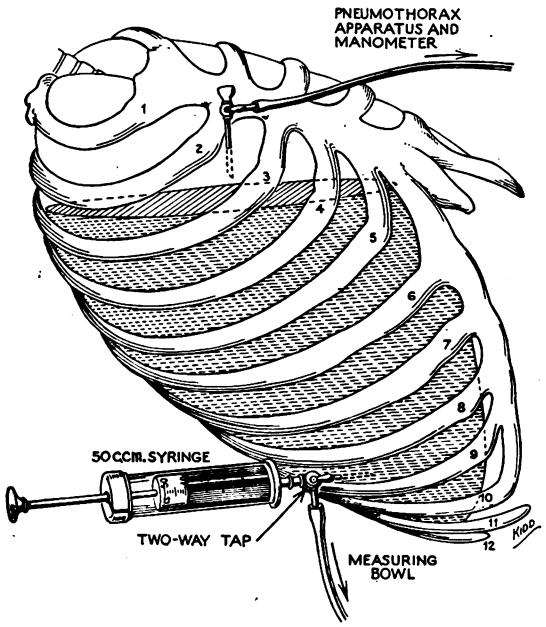
in a short time, but if the state of shock is increasing owing to loss of blood it is necessary to give a transfusion, remembering that the tension in the pleural cavity must be under control. To open the thorax wide in the presence of shock in order to deal with the hæmorrhage may occasionally bring off a brilliant success but will almost certainly kill many patients who would otherwise have recovered. Absolute conservatism is the keynote at this stage, and the administration of morphia, in considerable quantities if necessary, is the best line of treatment. Dyspnœa, if considerable, should be treated with oxygen. This symptom is present in nearly every lung injury and is often purely reflex in origin; where it is severe tension in the hæmothorax must be assessed by noting the position of the apex-beat and any subsequent alteration of it. This is the most important



METHOD OF AIR REPLACEMENT OF HÆMOTHORAX

1. Withdraw 50 c.cm. of fluid from pleural cavity with syringe.
2. Insert 30 c.cm. of air with syringe.
3. Alternately remove 50 c.cm. of fluid and inject 50 c.cm. of air, until about 300 c.cm. of air has been inserted. There will now be a suitable air space at the top of the hæmothorax cavity.
4. Insert needle connected to a pneumothorax apparatus and manometer, in the second intercostal space anteriorly. Direct manometric readings can now be taken.
5. Continue aspirating fluid with syringe until as much as possible is removed, maintaining the intrapleural pressure at −1 cm. of water by taking frequent manometric readings and admitting air from the pneumothorax apparatus. Leave final pressure at −1 cm.

physical sign in traumatic hæmothorax, and the position of the apex-beat should be clearly marked with a skin pencil at the first examination.

A radiogram of the chest is helpful in indicating the presence of foreign bodies, but even these may be obscured by the presence of blood. In the early stage of a traumatic hæmothorax symptoms and physical signs are of much greater diagnostic importance than a radiogram. The diagnosis of hæmothorax is finally confirmed by the aspiration of a small quantity of blood or blood-stained fluid, which is then sent to the laboratory for culture.

A localised hæmothorax causing no appreciable displacement of the apex-beat should be left alone after a preliminary diagnostic specimen of 5 c.cm. has been removed. A medium or large hæmothorax, whether composed of blood alone or of blood mixed with pleural fluid, and accompanied by continued pyrexia and the development of pressure symptoms or pain, calls for complete aspiration with air-replacement (fig. 1). The pressure should be left at zero or −1 cm. of water. It is advisable to empty the pleural cavity as completely as possible of the blood-stained fluid, so that the deposition of fibrin is minimal. For adequate control of these pressures some form of pneumothorax apparatus is necessary, air being admitted at the top of the chest while the fluid is drawn off below. Pleural fluid will still re-form, and it is important to watch for the recurrence of pressure symptoms. Repeated aspiration and air-replacement may be necessary.

Large pieces of clot should be sought, after aspiration and air-replacement, by screening in varying positions so that different parts of the pleural cavity are exposed. Clotting of any severe degree in an uninfected hæmothorax is rare. If it has occurred a thoracoscope should be inserted for examination and the clot removed. This is done through a second cannula, the clot being broken up into small pieces and extracted by means of suction and alligator forceps. Such a procedure will prevent the formation of a fibrin ball in the pleura, or of a persistent thickened pleura with its consequent permanent rib retraction, pain and diminution of vital capacity. The clot may be surrounding a foreign body, such as a small piece of clothing, the early removal of which may prevent generalised infection of the cavity. Bilateral hæmothorax should be treated by bilateral aspiration with air-replacement, leaving a slightly negative pressure on either side. When the blood has been entirely removed there is still the probability of recurrent collapse of one or both lungs as a result of pleural effusions and consequently of respiratory embarrassment. These cases must be kept under careful observation and radiographic control, and must be aspirated with or without air-replacement as necessary.

INFECTED HÆMOTHORAX AND FOREIGN BODIES

If infection supervenes closed intercostal drainage with water seal is indicated. Efficient drainage is shown by a steady daily filling of the drainage-bottle accompanied by an inspiratory rise and an expiratory fall in the water level in the glass sighting-tube. If the drainage becomes erratic, or a steady respiratory excursion is not maintained in the sighting-tube, the tube is too far into the pleural cavity, or, more likely, is obstructed with pieces of clot and debris. Wash-outs with azochloramide solution, 1 in 3300, will help to clear this and also to reduce the degree of infection, and irrigations with Dakin's solution will promote the separation of pieces of fibrin. Where a considerable amount of clot is present resection of a rib is necessary followed by removal of the clot with forceps and fingers. The cavity is then well flushed out with azochloramide solution, and a large drainage-tube is inserted which is connected to the closed drainage bottle. The wound must be stitched tightly round the tube to prevent leakage of fluid from or of air into the pleural cavity. Later, if the wound leaks and the discharge causes irritation of the surrounding skin, a zinc-oxide ointment should be applied. If the clot is not wholly removed the empyema will persist because the fibrin only lyses slowly; as a result a chronic cavity persists and may eventually need a thoracoplastic operation to close it. If the lung is re-expanding satisfactorily it is advisable not to remove the tube until the lung is in contact with the chest wall. The track of the tube should be filled with Lipiodol and a dressing sealed over the wound. If re-expansion of the lung is delayed by thickening of the pleura, it is justifiable to remove the tube once the pleural cavity is sterile. Before doing so it is advisable to put 50 c.cm. of triacetin into the cavity and to cover the external wound with a strip of batiste fixed by plaster along one edge. This acts as a valve, allowing of the escape of air or discharge from the cavity but preventing air-entry. Very occasionally a portion of the lung may have become partially detached by the passage of the missile and becomes gangrenous. This will separate itself, but will need manual removal from the pleural cavity. The toxic character of the empyema and the offensiveness of the discharge may be a guide to the occurrence of this complication.

Foreign bodies in the chest wall should be removed in the preliminary toilet of the wound. Foreign bodies lying in the hæmothorax may be safely left until a later stage, or until resection of a rib is undertaken for empyema. In our experience foreign bodies in the lung are better left alone, unless they are causing severe hæmoptysis; they are rapidly surrounded by fibrous tissue and rendered innocuous. Close proximity of the foreign body to large vessels is an indication for surgical intervention, but it is advisable to delay this, if possible,

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until the hæmothorax has cleared. Even small fragments of metal may cause considerable interstitial inflammatory changes. These are manifested clinically by bronchitic symptoms and pyrexia which may persist up to six weeks. It is not always easy to dissociate the rise of temperature due to pulmonary or pleural inflammatory irritation.

RE-EXPANSION OF THE LUNG

The rate of expansion of the lung depends on the size of the hæmothorax and on the damage to the underlying lung. Traumatic pneumonitis is followed by a considerable degree of interstitial fibrosis which makes the expansion of the affected portion of the lung difficult. Compensatory expansion of the lung surrounding this area takes place but this is delayed. If the hæmothorax is small obliteration of the space with absorption of the fluid and re-expansion will proceed rapidly, and in two to three weeks all that is demonstrable radiographically is an area of thickened pleura. During the stage of re-expansion the patient may complain of a good deal of pain from the roughened surfaces of the visceral and parietal pleura rubbing together. This pain may be at the front when leaning forward and at the back when leaning backwards, and is associated with a definite friction rub on auscultation. A small amount of air injected into the pleural space will relieve the pain and allow further resolution of the inflammatory condition of the pleura to take place before the two layers come into contact again. Parasternal pain on the opposite side to the injury is usually due to the drag on mediastinal adhesions.

In a large hæmothorax with complete or nearly complete collapse of the lung re-expansion takes place more slowly. If the mass of fibrin deposited on the surface of the collapsed lung is very dense re-expansion is delayed over months and even years, the cavity eventually becoming obliterated by the chest wall contracting and the mediastinum moving over. Such cases are rare. Once re-expansion has started it continues apace, and in the course of four to eight weeks the lung will again fill the thoracic cavity. During the stage of collapse and re-expansion there is a tendency for the ribs to fall in on the affected side, and for a scoliosis to develop away from this side. Treatment by remedial and deep-breathing exercises should be energetically pursued during this stage.

SUMMARY

Hæmothorax is present in about two-thirds of chest wounds of modern warfare. It may cause death from loss of blood or compression of the great veins and opposite lung. Persistent hæmorrhage suggests injury to a systemic vessel.

The response of the pleura to blood is a true mesothelial reaction. Some degree of clotting of the blood takes place as seen by the thoracoscope. Infection causes massive clotting which may often need manual removal of the infected fibrin.

Tension in a hæmothorax is assessed by the position of the apex-beat. Raised tension causes pyrexia which differs from that of empyema in being maintained instead of intermittent.

Immediate treatment should be confined to closing the pleura, attending to foreign bodies and bleeding vessels in the chest wall, and wound toilet. Severe dyspnœa requires oxygen therapy. Morphia is given freely. A small hæmothorax should be left alone: a larger one needs complete aspiration with air replacement, repeated if necessary. An infected hæmothorax is treated by closed intercostal drainage with water seal. Foreign bodies in the hæmothorax may be left to a later stage; those in the lung may be left altogether unless they are causing symptoms.

Remedial exercises are important in the stage of recovery.

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ANÆSTHESIA IN CHEST INJURIES

BY JOHN HALTON, M.B. Lpool

ANÆSTHETIST TO AN E.M.S. THORACIC SURGICAL UNIT, AND TO THE ROYAL INFIRMARY, LIVERPOOL

WAR wounds of the chest can be divided into two main types: those which require immediate surgical treatment and those for which surgical procedures are delayed. Wounds confined to the chest alone or associated with visceral or skeletal injuries may occur in either category. Patients requiring immediate surgery present one, and sometimes two physiological problems. They are suffering from a lack of oxygen in the tissues, the anoxia of shock; and, if the pleural cavity is open, their respiratory exchange is embarrassed, resulting in a further degree of anoxia. The problem of anoxia is not so acute in those patients who come to operation some time after their injuries were sustained. The body has had an opportunity for readjustment; diminished aerating surface in the lung, however, and general systemic disturbance due to sepsis, anxiety and drugs, render the margin between oxygen sufficiency and oxygen lack very narrow.

PHYSIOLOGY

Recent experiments show that wound shock, through the direct action of nervous impulses and tissue metabolites on the respiratory enzyme, reduced cytochrome, interrupts the cycle of cell respiration and oxidation. It has also been shown that morphia and the anæsthetic drugs acting on another respiratory enzyme, dehydrogenase, further tend to retard the vital cycle and to produce oxygen starvation of the tissues.

The mechanism of respiration with one—say the left—pleural cavity open is as follows: the left lung collapses and the mediastinum, through lack of support, becomes more mobile. On inspiration, air is sucked into the left pleural cavity through the opening in the chest wall; the mediastinum moves over to the right and prevents full expansion of the active right lung. When expiration takes place the mediastinum moves to the opposite side, air is expelled through the pleural wound, and the active lung, through lack of support, is prevented from emptying its expired air completely. In addition some of the expired air, containing a raised percentage of carbon dioxide, passes into the bronchi of the collapsed left lung. From here it is inspired again into the active lung. As a result of this transfer of air from lung to lung and of mediastinal migration, the active lung is never fully expanded, while the carbon-dioxide content of the air which it does receive is much higher than it should be.

It will be seen that there must be a comparatively rapid rise in the CO_2 percentage of the alveolar air of the active right lung and consequently of the arterial blood as a whole. Haldane has proved that a rise above normal of only 0·2% or 1·5 mm. of mercury in the CO_2 pressure of the alveolar and arterial blood so stimulates the centre of respiration that the respiratory excursion is doubled. Thus a patient with an open chest is forced to breathe more and more deeply. This increase in muscular effort raises still further the CO_2 tension in the blood and a vicious circle is established which if left unremedied will produce death, in a period varying with the size of the pleural wound and the mobility of the mediastinum. The somatic condition of the victims of high explosives presents a very different picture from that seen in cases for proposed lobectomy, pneumonectomy or repair of diaphragmatic hernia. Moreover pneumonitis of varying severity usually supervenes in cases of thoracic wound; and blast, which is not yet perfectly understood, even if it does not kill the patient, immediately renders portions of the alveolar system ineffective for a considerable time. The form of anæsthesia used must combat the existing anoxia, and in the case of the open chest relieve the patient of the necessity of increased respiratory effort until the pleural cavity can be closed and the mediastinum and affected lung stabilised. Every effort must be made to ensure that an adequate supply of oxygen is brought to the tissues post-operatively.

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ANÆSTHETIC METHODS

Recently the trend of anæsthesia for thoracic surgery has been towards either some type of closed-circuit gaseous anæsthesia in which carbon dioxide is absorbed, or else high spinal anæsthesia. In the cases under discussion, except for a few who are so fit that operation can be delayed, spinal anæsthesia must be ruled out if only on account of the incidental fall in blood pressure.

The closed circuit method has been found to be mechanically and physiologically inadequate. Stabilisation of the mediastinum and lung can be achieved if the gases are given under pressure, but the increased effort of expiring against this pressure has the same effect as if the patient were breathing ordinarily with one side of the chest open. Again, though the exhaled gas is washed clean of carbon dioxide the air which passes from lung to lung never reaches the absorbing medium so the vicious circle described above is never broken. Its effects are merely delayed and minimised for a short time. Moreover, if the other pleural cavity is opened by accident or intent, it is impossible with this form of anæsthesia to keep the patient alive for more than a short time.

Animal experiments have supported this; when a dog is linked up to a closed-circuit absorbing carbon dioxide perfectly and allowed to breathe an atmosphere rich in oxygen given at pressure, death will occur from anoxia in from three to five hours if one side of the chest is opened. Readings of the arterial CO_2 content, when plotted, show a rising curve. On the other hand, if a catheter is inserted into the dog's trachea, the tip reaching the point just above the carina and the size of the catheter being half that of the trachea, the animal can be kept alive indefinitely by a current of air alone, even if both sides of the chest are opened. Respiratory movements are practically non-existent nor can any evidence of anoxia or raised CO_2 pressure be detected. This intratracheal insufflation prevents, by efficient ventilation, any excess of carbon dioxide collecting in the lungs, and, by obliterating the muscular activity of respiration, further decreases CO_2 production.

INTRATRACHEAL INSUFFLATION

Bearing the foregoing facts in mind, it must be seen that, whether the operation is immediate or delayed, intratracheal insufflation anæsthesia is the method of choice. In actual practice the volume of air, gas or air-borne anæsthetic vapour blown into the lungs must be between 15 and 25 litres per min. and the flow must produce a pressure in the lungs in the region of 5–8 mm. of mercury. If both sides of the chest are open, this rate of flow may have to be increased, but it is inadvisable to increase the actual pulmonary pressure to more than 12 mm. of mercury. At pressures over this there is a real risk of damaging alveolar tissue. The diameter of the catheter must not exceed half that of the trachea in which it is placed. If it is too large, inefficient ventilation occurs, as the reflex current is impeded; on the other hand, if the catheter is too small the ingoing air current is insufficient.

CHOICE OF ANÆSTHETIC AGENT

Nitrous oxide or cyclopropane, neither of which irritates the pulmonary epithelium or produces toxic symptoms, are ideal in theory. The cost, however, of nitrous oxide used by insufflation is very great and of cyclopropane prohibitive. The remaining choice is between ether and chloroform. The irritating effect of ether and the toxicity of chloroform are considerably diminished when these drugs are given by intratracheal insufflation. The necessary volume of either agent can be rapidly built up in the blood-stream and as rapidly eliminated, thanks to the hyperventilation. The body-cells are thus protected from too prolonged and toxic exhibition of the anæsthetic agent. Ether must be used whenever possible, but when there is excessive bronchial secretion or extensive interstitial inflammation, or when diathermy has to be employed, chloroform is indicated, even though associated sepsis or cardiac debility may make this appear a more dangerous choice.

Apparatus can be of the simplest, but must consist essentially of the following parts: a pump capable of delivering a steady current of air up to 30 l. per min., a vapourising bottle for ether or chloroform capable of adjustment to varying vapour strengths; an adjustable blow-off valve and a manometer; a set of Magill's nasal intratracheal tubes, sizes 00 to 2; and a set of gum-elastic intratracheal catheters with suitable unions for attachment to the delivery tube of the apparatus.

ADMINISTRATION

These patients are not only affected by the experiences which they have undergone, but by varying degrees and combinations of anoxia, air-hunger, hæmorrhage and sepsis, all of which tend to create excessive apprehension and intolerance of anything covering the face, such as an anæsthetic mask. This is seen both before operation and when oxygen therapy is instituted post-operatively. Because of their direct action on cell-respiration, morphia and its derivatives cannot be used to allay this apprehension, and the intravenous barbiturates are generally contra-indicated because of their depressant effect on the respiratory centre which is already overburdened. These drugs can be used with care in some cases in which operation is delayed, but as a general rule no help can be given by premedication.

CONDUCTION OF ANÆSTHESIA

I have adopted the following technique with this type of case: a rapid induction is made with ethyl chloride or Vinesthene administered in a semi-closed mask of the Ogston pattern to which an oxygen tube is fitted; this is followed, when necessary, by just sufficient ether or chloroform, given by the drop method, to bring about the disappearance of the laryngeal reflex. Next a Magill's catheter of suitable size is introduced, as rapidly as possible, into the trachea; this is done through the nose by the "blind" technique. The catheter is then attached to the delivery tube of the apparatus which should be delivering about 15 l. of air per min. mixed with a minimum quantity of anæsthetic vapour. When this stage is reached cyanosis is almost invariably present but this disappears as soon as pulmonary ventilation is fully established. The strength of the anæsthetic vapour can now be gradually increased until the desired anæsthetic level is reached and the rate of flow balanced to the needs of the patient. This increase of vapour strength must be very gradual; if too strong a vapour impinges on the carina coughing and laryngeal spasm result, which restrict the expiratory air flow and cause a return of cyanosis. Occasionally laryngeal spasm may be exceedingly troublesome, and in some cases persists even into the deeper levels of anæsthesia. When it occurs, rather than keep the patient at an unnecessarily deep level, it is better to inject a small quantity of 2% Decicain solution directly into the intratracheal tube or with a fine needle into the anæsthetic delivery tube. The ingoing air stream will then blow the solution on to the sensitive carina and thus break the reflex arc.

Should blind intubation fail, it is extremely dangerous to try to get the patient deep enough to allow the tracheal tube to be passed with direct laryngoscopy. Even when the anæsthetic level is deep cyanosis causes spasm of the jaw muscles which make intubation exceedingly difficult. Again, facial injuries may render the direct method impossible or inadvisable. Facilities must therefore be immediately at hand for the performance of tracheotomy. On the rare occasions when it is necessary, anæsthesia can proceed as outlined above through the tracheal opening.

OXYGEN THERAPY

Postoperatively, all these cases are benefited by a course of oxygen therapy. In those who have been subjected to immediate operation it raises the alveolar oxygen pressure and acting as a direct antidote to the anoxia of shock hastens the recovery of the cycle of cell respiration. In those cases in which operation has been delayed, it helps to combat the cyanosis incidental to pneumonitis, pneumonia or deficiency of active lung area. By quietening respiratory effort and calming the anxiety of air-hunger, it renders convalescence less troublesome.

The oxygen tent is admittedly the most satisfactory form of administration. Next in order of merit is the nasal inhaler and bag; this is economical and as efficient as the tent, since it works on the intermittent flow principle. Its great disadvantage is that the patient must be trained to use it—to inhale through the nose and exhale through the mouth—sometimes a difficult task.

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In the B.L.B. mask a modification of the principle overcomes this difficulty. The simplest is the spectacle-frame method devised by Tudor Edwards. For this to be effective a minimum oxygen flow of 6 l. per min. is necessary, but few conscious patients can tolerate this for more than a short time, and oxygen delivery of less than this will not raise the alveolar oxygen pressure perceptibly.

SUMMARY

Patients requiring immediate operation after a chest injury are suffering from the tissue anoxia of shock, and if the pleural cavity is open respiratory embarrassment increases this anoxia.

Anæsthesia by a closed-circuit method produces further anoxia and is therefore unsuitable. Spinal anæsthesia must be ruled out because of the incidental fall in blood-pressure.

Intratracheal insufflation is the method of choice in either immediate or delayed operations, and it can be used conveniently with ether or chloroform. Nitrous oxide and cyclopropane are theoretically ideal but too expensive for general use. In the majority of cases no premedication can be given.

All cases are benefited by a postoperative course of oxygen therapy, given either in an oxygen tent, with the B.L.B. mask or with the spectacle-frame method.

ACCIDENTAL ACUTE CARBON-MONOXIDE POISONING

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It seems likely that with the development of aerial bombardment carbon-monoxide poisoning will become a clinical problem of increasing practical importance. The sources of poisoning that are likely to become frequent are ruptured gas mains, attempts to heat poorly ventilated shelters by means of open fires and, possibly according to the findings of Hadfield and others (1940), exposure to explosive gases. In civil practice in peacetime CO intoxication is most commonly encountered in attempted suicide, where the problems of aftercare fall mainly into the hands of the psychiatrist. The management of accidental CO poisoning, on the other hand, necessitates a knowledge of certain important somatic manifestations which it is the purpose of this paper to emphasise.

CASE-RECORD

A young man of 18 was admitted to Hammersmith Hospital at 4.30 A.M. on Oct. 3, 1940. He had gone with a companion into an Anderson shelter on the previous evening. Feeling cold, they had taken with them burning coals in a bucket from the kitchen fire. Three hours later a neighbour visited the shelter and found both lads drowsy. The patient, who had vomited, could not be roused, while his companion was taken out of the shelter in a somewhat dazed state. A dog which was with them in the shelter was also taken out but subsequently died.

The patient was collapsed; temperature 96·8° F., pulse-rate 140, blood-pressure 78/50, respirations 20 per min. There was no obvious pink colour about the lips or fingers, the patient being in fact rather pallid. No dyspnœa, but respirations were noisy. Chest showed crepitations localised to the right subclavicular region. Plantar responses flexor. Urine: sugar+, traces of acetone and albumin. Lumbar puncture: fluid clear; pressure 120 mm.; no block detected; cell-count and chemistry normal.

Since the full history was not available at the time of admission this patient presented a difficult diagnostic problem. The following possibilities had to be considered:—

1. Commencing right apical pneumonia. Against this was the subnormal temperature.

2. Diabetic coma. Glycosuria was present, but there was no smell of acetone in the breath and no diacetic acid in the urine, while eyeball tension was normal. The typical hyperpnœa of diabetic acidosis was also absent.

3. CO poisoning, with pneumonia and glycosuria as complications, was the most likely, and oxygen administration was begun.

Four hours after admission the history was obtained from acquaintances, and the blood, which was only then examined for CO with the reversion spectroscope, was "not more than 5% saturated." By this time consciousness had been fully recovered, although the mental state was unsatisfactory. The patient had no memory of the events of the preceding evening and was completely disorientated in time. Radiological examination of the chest six hours after admission showed a fluffy mottling of the upper zone of the right lung (fig. 1). Twelve hours after admission no physical signs could be detected over this zone, and two days later the chest was radiologically clear. An electrocardiogram (fig. 2) taken on the fourth day showed inversion of the T wave in all leads. Further graphs showed the same change in chest leads (fig. 3). This abnormality gradually improved, T 1 being the first to become upright, and all the T waves were normal after eighteen days.

A few days after admission the patient was able to remember his place of work and a recent summer holiday, previously forgotten. Simple mental arithmetic (subtraction), in which many mistakes had been made, became more accurate. At the end of two weeks memory and intellect were greatly improved, although curious gaps in his memory still persisted—e.g., when interviewed by his employer he could not recall many commonplace facts about his work, but remembered where certain private documents had been placed. The patient had previously been intelligent enough to have won a scholarship at school.

PATHOLOGICAL PHYSIOLOGY

Breathing air containing 2 parts of CO per 1000 will saturate half the hæmoglobin in the body in about an hour (Haldane 1895) and lead to severe symptoms from oxygen-lack. Small animals and children develop symptoms of CO poisoning more severely and much earlier than human adults. This depends on the fact that in small animals all the blood in the body passes through the lungs many times a minute, instead of once a minute as in the resting human adult, and thus reaches a high degree of saturation more rapidly; hence the use of mice and canaries as indicators of dangerous concentrations of CO.

It should also be borne in mind that CO does not merely annihilate the oxygen-carrying capacity of the hæmoglobin with which it is combined but interferes with the dissociation of oxygen from the hæmoglobin which remains. Thus the symptoms of a patient with his blood half saturated with CO are far more serious than those of a patient suffering from anæmia with 50% hæmoglobin. The deleterious effect on the dissociation of the remaining oxyhæmoglobin is counteracted by carbon dioxide. This explains why sufferers from CO poisoning—e.g., the dog in the above record—may collapse on being taken into the open air. Where the CO has been produced by imperfect combustion it is always accompanied by a raised concentration of carbon dioxide; the beneficial effect of the latter is lost on removal of the patient to the open air, while the CO is retained by its high affinity for hæmoglobin.

DIAGNOSIS

The diagnosis of CO poisoning depends mainly on the history. The detection of CO in the blood after the usual delays of transit to hospital may be difficult. The rate of removal of CO from the blood at any moment depends on its concentration—high concentrations fall quickly to lower levels, while the last traces are only slowly eliminated. The reversion spectroscope, commonly used in hospital laboratories for the detection of CO, does not give accurate results unless concentrations of 10% or more are present in the blood. Even in acute poisoning the concentration of the gas has usually fallen below this level in the course of a few hours. The history of exposure to a potential source of CO is therefore of much greater importance. Especially typical is the story of headache and confusion, followed by collapse on coming into the open air. This "open-air collapse"

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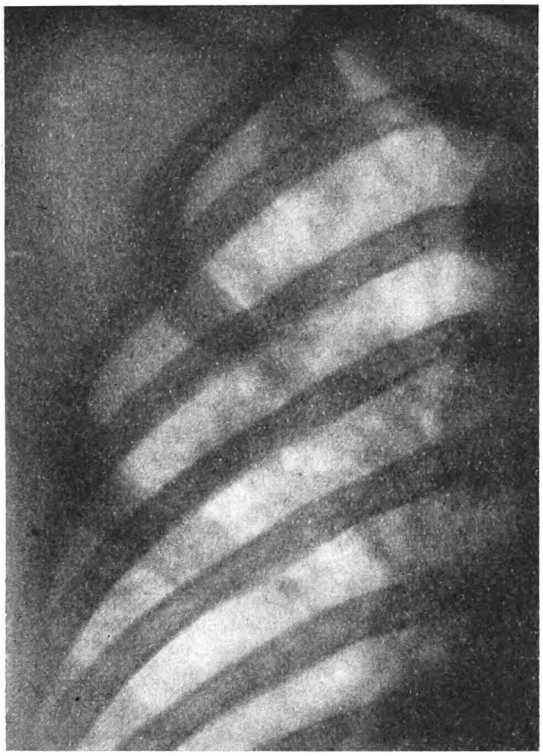

FIG. 1—Radiogram showing patchy consolidation (? atelectasis) at right apex six hours after admission with acute CO poisoning. A few hours later the lungs were clinically and radiologically clear.

will be absent if there has been no carbon-dioxide admixture—e.g., in some cases of coal-gas poisoning.

CLINICAL MANIFESTATIONS

With a blood saturation of 20% fullness and throbbing in the head begin to be felt, and as the saturation approaches 40% the headache becomes more severe, with dimness of vision and some overbreathing. Towards 50% there is mental confusion, and any effort precipitates intense dyspnœa. The patient is giddy and staggers on walking. Vomiting may also occur. Although the blood looks pink on being taken for examination at this stage the usual appearance of the victim is one of sickly pallor. These symptoms are all much improved by breathing oxygen.

COMPLICATIONS AND SEQUELÆ

Central nervous system.—The brain is particularly susceptible to damage from anoxia. The mental capacity is often impaired, with confusion, disorientation, lack of judgment and amnesia. Speech defects and aphasia of various types may also occur. Apart from these mental changes, which usually progress to complete recovery, other symptoms may result from damage to selected parts of the central nervous system. The basal ganglia are specially apt to suffer, and parkinsonism, with or without pyramidal-tract manifestations—e.g., hypertonia—may result. While dimness of vision is a feature of the acute stage recovery is the rule, but permanent damage to the sight occasionally ensues. This may be associated with changes in the fundi or damage to the visual centres.

Cardiovascular system.—The blood-pressure may be low or well maintained, the pulse is usually rapid, and detailed examination of the heart may show changes of significance. Electrocardiographic changes often occur, especially in the T waves and ST segments. The T wave becomes shallow or inverted, particularly in lead III and this change may persist for many days. These electrocardiographic changes may be absent immediately after the exposure to CO and develop twelve to twenty-four hours later. The significance of this is not at all clear (Stearns, Drinker and Shaughnessy 1938).

Metabolism.—Claude Bernard noted that the urine of animals poisoned with CO often contained sugar, and this observation has been confirmed many times in both animals and man. The effects are ascribed to asphyxia acting through the central nervous system and the suprarenals. There is no evidence, however, that this ever leads to true diabetes.

Respiratory system.—Bronchopneumonia is a frequent cause of death in severe CO poisoning. Mucus accumulates in the respiratory passages, and patchy lobular collapse is likely to develop with the possibility of superadded infection. The early, and fortunately aborted, phase of this complication was particularly well seen in the case described here.

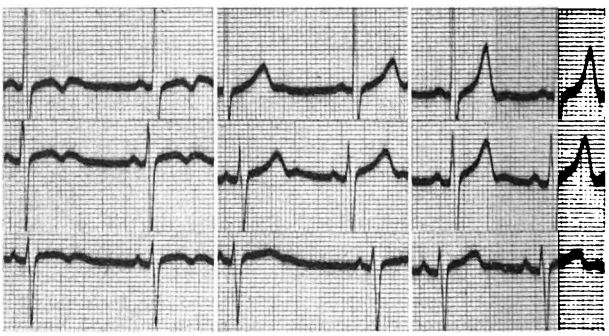

FIG. 3—Chest leads (from above down: Lead 4R, left pectoral and right pectoral) showing inversion of T in all leads and gradual recovery.

TREATMENT

Immediate.—Having removed the patient from the CO-containing atmosphere no time should be lost in administering oxygen, and preferably oxygen plus 7% carbon dioxide (Heller, Killiches and Drinker 1929). Emphasis has already been placed on the importance of carbon dioxide in making more oxygen available to the tissues. In addition, it is the best stimulant to the respiratory centre we possess. It has been shown that following even a short exposure to CO much of the resulting damage occurs *after* removal from the poisonous atmosphere. This is due to the loss of the beneficial effects of carbon dioxide, and as the breathing becomes shallow CO is not removed rapidly enough. The new B.L.B. mask (Card et al. 1940) provides a very effective way of giving an oxygen and carbon-dioxide mixture. Should breathing cease this mask can be kept on while artificial respiration is attempted. Warmth is very important in the early treatment, for the body temperature is often low. Drugs have no place at present in the immediate treatment of CO poisoning.

After-care.—It is clear from the case recorded here that a person exposed to CO may suffer from the sequelæ of exposure long after the gas has been eliminated from the blood. The patchy atelectasis

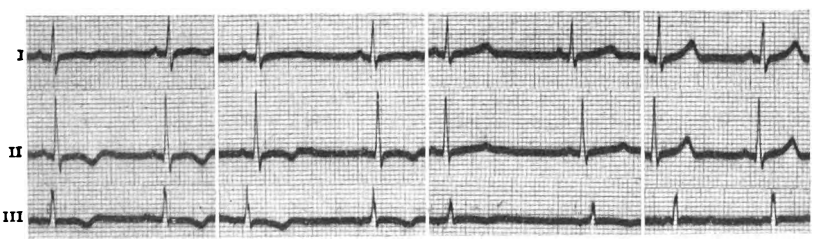

FIG. 2—Standard lead electrocardiograms showing inversion of T in all leads and gradual recovery.

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of this boy's right lung might well have become a full-blown bronchopneumonia. His electrocardiographic abnormalities took a fortnight to disappear. Although their exact significance is not known we feel that cases showing such changes should be under observation and should not be allowed to resume full activities. Finally, although this young man was recovering his normal mental state, the process was relatively slow; thus it may be some time before a patient can be allowed to care for himself.

SUMMARY

Accidental carbon-monoxide poisoning may become common from the rupture of gas-mains by bombs, from exposure to explosive gases and from fires in inefficiently ventilated shelters.

A case is described in a young man who warmed his shelter with a bucket of hot coals.

The symptoms are increasing headache, dimness of vision, hyperpnœa, confusion, giddiness and vomiting. Collapse often follows removal to the open air. Withdrawn blood may look pink but the patient is pale. Owing to the difficulty of detecting small amounts of CO in the blood the history is of prime importance in diagnosis.

Complications and sequelæ include mental impairment, tachycardia, electrocardiographic changes, glycosuria, and pulmonary lobular collapse often leading to bronchopneumonia.

Treatment consists in removal from the poisoned atmosphere, administration of oxygen and carbon dioxide, and warmth. Complications may require lengthy aftercare.

We wish to thank the Chief Medical Officer, London County Council, for permission to publish this case.

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LEUCOCYTE COUNT IN RUBELLA

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THE epidemic of rubella in the winter of 1939–40 afforded an opportunity of observing the leucocyte count in this infection. Only adults were studied, for the most notable change in the blood is in the leucocytes of the lymphocyte system, and in children a lymphocytosis is a non-specific reaction to many infections.

MATERIAL AND METHODS

Blood was obtained from 37 males aged fifteen to thirty-nine (mean twenty-two) and 24 females aged eighteen to forty-five (mean twenty-four). One to four blood-counts were done on each patient during the first two weeks of the disease, making a total of a hundred and thirty-three counts (see table). The days of the disease were numbered from the onset of the rash, the first day being the day on which it appeared. (In 23 patients the rash appeared on the first day, in 20 on the second, in 10 on the third, and in the remaining 8 on the fourth to seventh day.) A differential count of 200 cells was made at each examination, on films stained by Leishman's method, and expressed as the total number per c.mm. besides the percentage of the various cells. The percentage differential count may mislead if it is not correlated with the total leucocyte count; for example, the mean neutrophil percentage fell progressively from 64% on the first day to 44% on the fifth, yet the mean number of neutrophils in the blood remained constant at 3000 per c.mm.

NUMBER OF BLOOD-COUNTS DONE ON EACH DAY OF THE DISEASE

Day	1	2	3	4	5	6	7	8	9	10	11	12
No. of cases	7	22	27	9	11	18	3	4	10	13	6	3

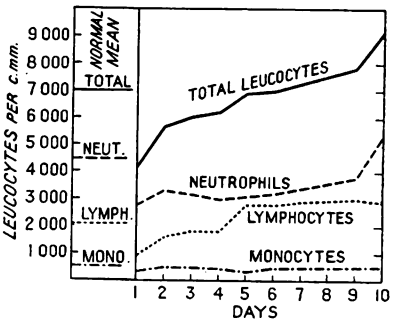

FIG. 1—Mean leucocyte counts in rubella. Day 1 is the day of onset of the rash. The horizontal lines at the side show the normal mean.

RESULTS

The total and differential leucocyte counts are shown graphically in figs. 1 and 2. The changes that took place in the leucocyte picture were influenced neither by the sex or the age of the patient nor by the severity of the disease or the duration of pyrexia.

Total leucocyte count.—The mean leucocyte count was low at the beginning but rose steadily, passing the normal mean of 7000 per c.mm. on the sixth day and reaching 9000 per c.mm. by the tenth day. About a sixth of the patients had a leucopenia (< 4000 per c.mm.) during the first four days, but none after this, and a few had a leucocytosis (> 10,000 per c.mm.) after the sixth day. The lowest count was 1400 per c.mm. on the first day, and the highest 14,000 per c.mm. on the eleventh day.

Neutrophils.—The mean neutrophil count was 3000 per c.mm. for the first six days and then rose to 5000 per c.mm. by the tenth day. Half the patients had a neutropenia (< 3000 per c.mm.) on the first two days, a third on the sixth day, and only a tenth after the tenth day. A third had a neutrophil leucocytosis (> 6000 per c.mm.) on the tenth and subsequent days. The lowest neutrophil count was 868 per c.mm. on the first day, and the highest 7840 per c.mm. on the eleventh.

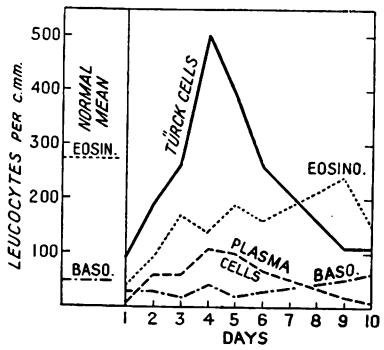

FIG. 2—Mean leucocyte counts in rubella. Explanation as in fig. 1.

Schilling count.—The observations made by MacBryde and Charles (1935) on the Schilling neutrophil count in rubella were confirmed by this series. At the onset there was a great increase in stab cells, which during the first three days constituted half the neutrophils; then the proportion fell to the normal 10% by the ninth day. The highest stab-cell count was 84% of the neutrophils on the third day (juveniles 0, stabs 50, segmented 10), and the lowest at the onset was 10% of the neutrophils on the second day (juveniles 0, stabs 6, segmented 53). Juvenile neutrophils were very rare throughout the disease. The counts did not confirm that "the recovery phase in rubella is associated with a high-grade shift to the left in the polymorphonuclear cells" (cf. Whitby and Britton 1939).

Eosinophils and basophils.—The eosinophil count was low at the onset but rose concomitantly with the neutrophil count. A slight eosinophilia developed in a few cases at all stages, the highest figures recorded being 770 per c.mm. on the sixth and eleventh days (normal 150–400 per c.mm.). About the normal number of basophils was seen throughout.

Lymphocytes.—The mean lymphocyte count was low at the beginning; on the first day 6 out of 7 patients had a lymphopenia (< 1500 per c.mm.), and on the second day 12 out of 22. The count rose rapidly, however,

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and from the fifth day onwards there was a lymphocytosis, with a mean count of about 3000 per c.mm. (normal mean 2000 per c.mm.). As early as the third day 4 out of 27 patients had a lymphocytosis (> 2700 per c.mm.), and subsequently the proportion was a half to two-thirds. The lowest lymphocyte count was 266 per c.mm. on the first day, and the highest 6160 per c.mm. on the sixth day.

Monocytes.—The mean monocyte count remained within normal limits, about 500 per c.mm. throughout the period of observation. An occasional patient had a monocytosis (> 800 per c.mm.) at all stages, but half the patients had fewer monocytes than normal (< 350 per c.mm.) during the first six days.

TÜRCK CELLS AND PLASMA CELLS

The presence of certain abnormal leucocytes in the blood in rubella is generally recognised, but there is no agreement about which of them should be described as Türck cells and which as plasma cells. The plasma cell, however, can be strictly defined, because it is commonly seen in bone-marrow smears, in the blood in other diseases, and in histological sections. The appearance of the Türck cell is much more variable, and "intermediate" cells should be classified as Türck cells and not as plasma cells.

The plasma cell is an oval cell about 8–14 μ in diameter, with an eccentric nucleus 5–7 μ in diameter, which shows well-marked "cartwheel" condensation of the chromatin. The cytoplasm is a deep lilac, with a clear space on the central side of the nucleus.

The earliest form of Türck cell, which was seen most commonly at the onset, is a large oval cell 25–40 μ in diameter, with a nucleus 15–30 μ. The nucleus has a well-defined fairly light reticulum, with two to five prominent nucleoli. The cytoplasm is lilac and often vacuolated or with a clear space at one side of the nucleus. These may be the cells described as lymphoblasts by Carroll (1934), but they are very different from the true lymphoblast. In this series two of these cells were in mitosis and two had a double nucleus. A more mature type of Türck cell was always commoner than these early forms and was the only type seen later in the disease. As the cell matures it becomes smaller, the nucleus loses its nucleoli, and its chromatin condenses; hence finally it merges with the typical plasma cell.

Almost every patient showed these Türck cells throughout (the exceptions being 1 case on the sixth day, 1 on the ninth, 3 on the tenth, 1 on the eleventh, and 2 on the twelfth), and in every patient they were present in the earlier blood-counts. The mean was 90 per c.mm. (2·5% of the total leucocytes) on the first day, on the fourth day it reached its maximum of 500 per c.mm., and then it declined steadily to 80 per c.mm. on the eleventh day. The highest count was 1056 per c.mm. (11% of the total leucocytes) on the fourth day.

Plasma cells, as strictly defined above, were much rarer than Türck cells. They were absent in 5 out of 7 patients on the first day, in a half to a third during the first week, and in the great majority from the ninth day onwards. The mean count rose to a maximum of 100 per c.mm. on the fourth and fifth days and then fell steadily to 0 on the eleventh day. The highest count was 410 per c.mm. (5% of the total leucocytes) on the fourth day.

OTHER INVESTIGATIONS

Erythrocyte sedimentation-rate.—In 35 patients this was measured by Wintrobe's (1933) method and "corrected" for cell volume by the method of Hynes and Whitby (1938); fifty-three of the eighty-six observations made during the first twelve days were normal, but 10 patients had a slight or moderate increase during the first week. The higher rates were usually, but not invariably, associated with a temperature above 100° F. There was no correlation between any other feature of the blood-count and the sedimentation-rate.

Paul-Bunnell heterophil antibody test.—This was performed in 26 patients at the onset and repeated about the tenth day; it was negative in every case. The technique of Davidsohn (1939) was used.

DIFFERENTIAL DIAGNOSIS

Measles.—The changes in the blood-picture in measles are often the same as in rubella, with large numbers of Türck cells and plasma cells (Carroll 1934). These cells were absent on the first day in 1 adult with measles in this series, but by the fifth day the blood-count was identical with that of rubella. Another patient had no Türck or plasma cells on the first day, but no further counts were done.

Scarlet fever.—The initial leucocytosis of scarlet fever contrasts strongly with the leucopenia of rubella. French (1939), for example, in a series of 170 untreated cases found the mean leucocyte count to remain at 16,000 per c.mm. during the first nine days. During the first week no patient had less than 5000 leucocytes per c.mm., and 94% had more than 10,000. About 80 or 90% of the cells are neutrophils, some of which may contain Döhle bodies—irregular blue clumps about 2 μ in diameter. These bodies may be found in measles but not in rubella.

Glandular fever.—The characteristic blood-picture and positive Paul-Bunnell reaction in glandular fever clearly distinguish it from rubella.

SUMMARY

(1) Serial leucocyte counts were performed on 61 adults with rubella.

(2) A leucopenia was the rule at the onset, with the leucocyte count rising to the upper limit of normal by the tenth day.

(3) At the onset half the patients had an absolute neutropenia, which gradually became corrected, until after the tenth day a third of the patients had an absolute neutrophil leucocytosis.

(4) There was an absolute lymphopenia at the onset, but an absolute lymphocytosis after the fifth day.

(5) Türck cells were always present and commonly numerous and reached their maximum about the fourth day. Plasma cells were present in a half to two-thirds of the patients during the first week but disappeared after this.

(6) The erythrocyte sedimentation-rate was usually normal, but it was increased in a quarter of the patients during the first week.

(7) The Paul-Bunnell test was negative.

(8) A leucocyte count is sufficient to distinguish between rubella and scarlet fever or glandular fever, but not between rubella and measles.

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MODIFIED FLOW-METERS FOR ANÆSTHETIC GASES

BY E. A. PASK, M.B. Camb., D.A.

(*From the Department of Anæsthetics, University of Oxford*)

THE simplest type of gas flow-meter for anæsthetic work is the water-depression meter. The principle of this is seen in fig. 1. The gas flows from the source through the tube A–B–C–D–E. At the point C it meets a constriction which resists its passage. If gas is to flow, therefore, the pressure at the point B must be greater than that at the point D, and this difference in pressure (measured by the manometer U) bears a relation to the rate at which gas is passing through the constriction C. For a given gas the manometer can be graduated in terms of volumes of gas flowing through the constriction in unit time.

The usual application of this principle in anæsthetic practice is illustrated in fig. 2. X is a gas-tight jar,

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containing water up to the level Y. Gas enters through the tube A–B and escapes through the jet C into the space D above the water in the jar, and thence through the tube E to the apparatus to be supplied. Points B and D correspond to those in fig. 1, and again the difference in pressure between these two points is related to the rate at which gas passes through the constriction (jet C), but in this case the difference is measured by the degree to which the water level in the transparent tube Z is depressed below the water level in the jar X.

This type of meter has certain characteristics which may in some circumstances be disadvantageous. (1) The meter is usually bulky, for in order to obtain a suitable scale the jar must be tall. (2) If gas in excess of that registrable on the scale is passed through the meter it bubbles from the bottom of the tube Z through the water in X and is liable to throw moisture on the jet, leading to blockage and corrosion. (3) For anæsthetic purposes very fine-bore jets are needed and these are difficult to clean, especially if a soft metal such as brass is used which scores easily. If the jet is partially blocked, or if its bore becomes enlarged by injudicious cleaning, the meter will be unreliable. (4) The scale of the meter, when graduated in terms of volumes per minute, is far from linear. For example, in a meter designed to register 0–500 c.cm. of oxygen per minute the increase in depression produced by altering the rate of flow from 50 to 100 c.cm. will be much less than that produced by altering the rate from 450 to 500 c.cm. per minute. In other words the readings are compressed at the low end of the scale and expanded at the high end. For most purposes this is the reverse of what is desired.

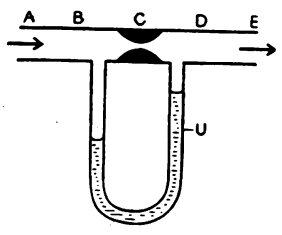

FIG. 1

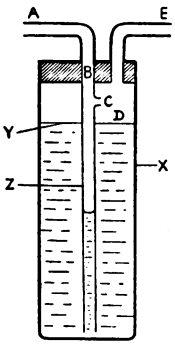

FIG. 2

FIG. 1—Principle of water-depression meter. Gas flows from A to E. C is a constriction, resisting the passage of the gas, and U a manometer.

FIG. 2—Application of water-depression principle to anæsthetic practice. X is a gas-tight jar containing water to level Y. Gas enters by A–B and escapes through jet C into space D and so to tube E. Pressure is measured by depression of water in Z.

MODIFICATIONS

An attempt has been made to modify these characteristics by the following means.

Instead of a jet, a length of several centimetres of capillary tubing is used to form the "constriction." Since the resistance is then spread over a considerable distance, instead of being concentrated in an orifice, the bore of the constriction can be greater. If the material used for the capillary is a hard one, such as stainless steel or thick-walled glass tubing, cleaning is facilitated since the bore is not easily deformed. Further, when a length of capillary tubing is substituted for a jet the scale becomes much more nearly linear.

In order to limit the size of the necessary container, two constriction capillaries have been arranged in circuit with a single depression tube so that by manipulating a tap either one or both capillaries can be used to produce the necessary resistance. Thus one depression tube can be made to read on either a "coarse-flow" or "fine-flow" scale.

In order to overcome the difficulty described in (2) above, the layout of the circuit has been modified as shown in fig. 3.

Several meters have been built incorporating some or all of the modifications. Two will be described as examples.

Meter for small or large rates (fig. 3).—Gas flows from A through either one or both of the constriction capillaries C.I. or C.II., according to whether tap T is closed or open, and thence through the out-flow tube D–E. The pressure at B is transmitted to the surface of the water in the depression tube Z; that at D is transmitted to the surface of the water in the jar X, by means of the tube P. This tube is of small bore, since its normal function is only to equalise pressures, and its exit from X is shielded by a baffle. If "bubbling-through" occurs in the bottle it is unlikely that water will find its way into the tube, but even if it does it will not come into contact with the constriction capillaries C.I. and C.II.

The object here was to produce a meter, as inexpensive as possible, which would be capable of measuring accurately the small rate of flow of oxygen necessary for "closed-circuit" technique, and which would at the same time cover the range needed when a Boyle's apparatus is used. Its basis is a standard 7 in. honey jar, the "constrictions" are heavy glass capillary tubing completely ensheathed in thick-walled rubber pressure tubing, and standard gas-fitters nipples and taps are used. There are two depression tubes, one for nitrous oxide which reads from 0–10 litres per min., the other for oxygen. For the sake of simplicity only the oxygen depression tube is illustrated in fig. 3. The depression tube is connected to two constriction capillaries, one of which is controlled by a tap (T). With the tap open flows of 0–3 litres per min. can be read on the scale to the right of the tube, while when the tap is closed resistance to the flow of gas is of course increased and flows of 0–500 c.cm. per min. in units of 50 c.cm. can be read on the scale to the left of the tube. The latter scale is employed for closed-circuit work. Non-return valves (bicycle-tyre valves) are incorporated in the gas inlets. The meter screws on a Boyle's bottle in the same way as the familiar bubble sight-feed bottle. Either nitrous oxide or oxygen can be bubbled through the meter without influencing its reliability if large quantities of the gases are required quickly, and the accuracy of the readings is not greatly disturbed if the meter is mounted slightly off the vertical. The meter is as fragile as any other similar glass bottle, but if a part breaks it is likely to be inexpensive and easy to replace (e.g., the honey pot).

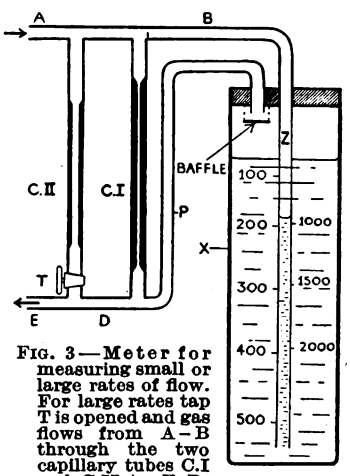

FIG. 3—Meter for measuring small or large rates of flow. For large rates tap T is opened and gas flows from A–B through the two capillary tubes C.I and C.II to E–D, the pressure being read on the scale to the right of tube Z. For smaller rates the tap is closed, the gas flows through the finer capillary tube C.I only, and the pressure is read on the left-hand scale. P is a small-bore tube for equalising pressure. X is a 7 in. honey pot.

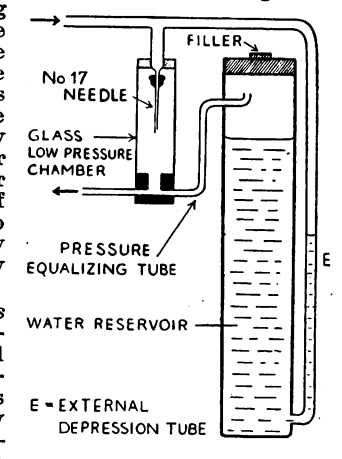

FIG. 4—Meter for measuring very small rates of flow.

Meter for very small rates (fig. 4).—This is of somewhat different design and employs an external depression tube. It was designed to measure very small flows of oxygen—0–50 c.cm. per min. in 5 c.cm. per min. divisions. Here the constriction capillary is a standard No. 17 stainless steel hypodermic needle, and the flow of oxygen through it gives a scale reading which is almost linear.

I am indebted to Mr. R. Salt, technician to this department, for his coöperation in the construction of the meters, all of which are calibrated empirically.

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CHEMOTHERAPEUTIC INVESTIGATIONS ON THE VIRUS OF LYMPHOGRANULOMA VENEREUM

By G. M. Findlay, C.B.E., M.D., D.Sc. Edin.

(*From the Wellcome Bureau of Scientific Research, London*)

In a previous communication (MacCallum and Findlay 1938) evidence was brought forward to show that sulphanilamide and 4 : 4′-diaminodiphenylsulphone glucoside were capable of protecting a considerable proportion of mice against infection with active strains of the virus of lymphogranuloma venereum (lymphogranuloma inguinale) injected intracerebrally. Proseptasine (*p*-benzylaminobenzenesulphonamide) was of less value. Bär (1938) obtained similar good results with sulphanilamide in mice as did Levaditi (1938a) in guineapigs.

In further experiments Levaditi (1938b, c and d) found that sulphanilamide, uleron, sodium 4-sulphamidobenzene-azo-3′: 5′-diaminobenzoate and *p*-acetylaminobenzenesulphon-dimethylamide (Girard 111) were all active in preventing infection in mice, the last compound being specially effective. The activity of *bis* (*p*-phenolsulphonylaminophenyl)sulphone (Girard 138) was slight, while dihydroxydiphenylsulphone and 4-nitro-4′-aminodiphenylsulphoxide were inactive. Dipotassium *p*-sulphamido-phenyl-azosalicylate (lutazol, G33) synthesised in 1936 by Goissedet and others was found by Levaditi, Vaisman and Reinié (1939) to possess considerable activity in a single experiment on a monkey and in mice infected with lymphogranuloma venereum. In America, Hebb, Sullivan and Felton (1939) have employed sodium sulphanilyl sulphanilate and sodium sulphanilate with success while sulphapyridine has been used by Schlossberger and Bär (1939) and the same compound, as well as sulphathiazole, by McKee and others (1939). Albucid, diseptal B, diseptal C, soluseptasine and rodilone have also been found to have a curative action in mice (Bär 1940).

The experimental successes obtained in animals have been paralleled by a considerable number of clinical trials in man. Trautman and Thomason (1938) prefer sulphanilamide to fever therapy in cases of lymphogranuloma venereum with involvement of the inguinal lymph-nodes, since they find (1940) that with sulphanilamide therapy the length of stay in hospital is reduced by more than half as compared with other methods of treatment. Shaffer and Arnold (1938) and Shropshear (1938) have also used sulphanilamide not only in cases with buboes but in those with rectal stricture. Other observers such as Earle (1939a and b), Weissenbach and Temine (1939), and Durel and others (1939) have used sulphapyridine with good results in man.

PRESENT INVESTIGATIONS

Despite the large number of compounds which have been shown to possess an action on the virus of lymphogranuloma venereum no attempts have been made to assess their relative efficiency in experimental infections in mice. In the following experiments, therefore, mice injected intracerebrally with the virus of lymphogranuloma venereum were treated with a daily dose of 10 mg. per 20 g. of body-weight of the following compounds; sulphanilamide, lutazol, sulphapyridine, sulphathiazole, sulphamethylthiazole and the disodium salt of 4 : 4′-*bis*-*o*-carboxybenzoylaminodiphenylsulphone, which will be referred to here under its laboratory number 209/178. The daily dose was divided into two equal portions given morning and evening.

With the exception of the last, which being freely soluble was injected subcutaneously, the compounds were suspended in gum acacia and fed to mice by stomach tube twice daily. The first dose was administered within twenty minutes of the intracerebral injection of the virus and thereafter for six days. The treated and control mice were kept under observation for fourteen days, and 100 mice were treated with each compound, the same number being used as controls. At the same time a number of other sulphonamide, sulphone and sulphide derivatives prepared by Dr. T. A. Henry and Mr. W. H. Gray were tested for their action on the virus of lymphogranuloma venereum. These compounds were suspended in sterile olive oil so that 10 mg. was contained in 0·2 c.cm. of oil: the oil was injected into the muscles of the thigh in doses such that the mice received 10 mg. per 20 g. of body-weight.

The results obtained with sulphanilamide (table I) show that of 100 treated mice 53 survived, while only 14

TABLE I—EFFICIENCY OF VARIOUS COMPOUNDS IN PROTECTING MICE INJECTED INTRACEREBRALLY WITH VIRUS OF LYMPHOGRANULOMA VERERUM

—		Number of mice	Mice developing symptoms	Av. days from inoculation to development of symptoms	Av. days from inoculation to death	Mice surviving without symptoms	Mice developing symptoms but surviving	Total survivors
Sulphanilamide	T	100	71	3·85	5·45	29	24	53
	C	,,	96	2·75	4·3	4	10	14
Lutazol	T	,,	40	6·12	5·0	60	20	80
	C	,,	84	2·41	4·26	16	25	41
Sulphapyridine	T	,,	60	3·6	4·5	40	10	50
	C	,,	98	2·2	3·35	2	11	13
Sulphathiazole	T	,,	43	3·9	5·5	57	8	65
	C	,,	92	2·3	4·5	8	18	26
Sulphamethylthiazole	T	,,	81	3·75	4·8	18	19	37
	C	,,	100	2·07	3·65	4	7	9
209/178	T	,,	75	2·5	4·5	25	6	31
	C	,,	96	2·42	4·45	4	13	17

control mice lived. At the same time the average number of days from inoculation both to the development of symptoms and to death was longer in the treated than in the controls. The effects with lutazol, sulphapyridine, sulphathiazole, sulphamethylthiazole and 209/178 are also shown in the table. If the number of control mice surviving in the experiments with each compound is represented by unity the relative efficiency of the various compounds can be represented by the following figures:

Compound	Relative proportion of survivors	Compound	Relative proportion of survivors
Sulphanilamide ..	2·20	Sulphathiazole ..	2·50
Lutazol ..	1·95	Sulphamethylthiazole	4·10
Sulphapyridine ..	3·84	209/178	1·82

It will be seen that the most efficient compound was sulphamethylthiazole, which was slightly more efficient than sulphapyridine. Sulphathiazole and sulphanilamide were almost identical if somewhat less active than the two former, while of slightly less activity were lutazol and 209/178. All these compounds were also tested for possible activity in mice on the viruses of yellow fever (neurotropic strain) Rift Valley fever, lymphocytic choriomeningitis and influenza A (W.S. strain).

In the case of the other compounds tested for activity against the virus of lymphogranuloma venereum, 12 treated and 12 control mice were observed for fourteen days; each mouse received the drug on six consecutive days. The results are shown in table II.

Of these compounds only ammonium 4-nitrobenzenesulphonate, and 4 : 4′-dinitrodiphenylsulphone showed some activity against the virus of lymphogranuloma venereum. Further investigations are being carried out. These compounds were all ineffective for the viruses of yellow fever, Rift Valley fever, influenza A, and lymphocytic choriomeningitis except that 4-dihydrochaulmoogramidobenzenesulphonamide appeared to produce slight retardation in the development of symptoms due to the virus of lymphocytic choriomeningitis. On repeating the experiment, however, with larger

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TABLE II—ACTIVITY OF COMPOUNDS AGAINST VIRUS OF LYMPHOGRANULOMA VENEREUM

Each + represents the survival of 2 treated mice after the death of the corresponding controls.

Compound	Activity
Methyl 4-nitrobenzenesulphinate	−
4-Nitrobenzoyl-4′-aminobenzenesulphonamide	−
4-Nitro-4′-sulphonamidodiphenyl ether	−
4-(-2′-Pyrrolidone-5′-carboxyamino)-2-methylbenzenesulphonamide	−
4-Dihydrochaulmoogramidobenzenesulphonamide	+
4-Quininamidobenzenesulphonamide	−
Diphenylsulphone-4 : 4′-*bis*-azo-8-hydroxyquinoline	−
4 : 4′-Dinitrodiphenyl disulphide	−
Ammonium 4-nitrobenzenesulphonate	+++
4 : 4′-Dinitrodiphenylsulphone	++
4-Amino-4′-nitrodiphenylsulphide	−

numbers of mice no significant difference could be found between treated and control mice.

A small number of mice have been given sulphanilamide and sulphapyridine mixed with their food and have been successfully protected against intracerebral inoculation of the virus of lymphogranuloma venereum. This method of giving drugs ensures a more constant concentration of the compound in the blood (cf. Litchfield et al. 1939).

SUMMARY

Experiments on mice infected intracerebrally with the virus of lymphogranuloma venereum and treated daily by mouth with 10 mg. per 20 g. mouse showed that under the experimental conditions employed the most active compound was sulphamethylthiazole, followed by sulphapyridine, sulphathiazole, sulphanilamide, lutazol and di-sodium 4 : 4′-*bis*-*o*-carboxylbenzoylaminodiphenylsulphone. Unfortunately in man sulphamethylthiazole may occasionally cause polyneuritis.

These compounds had no action when tested in mice on the viruses of yellow fever (neurotropic strain), Rift Valley fever, influenza A (W.S. strain) and lymphocytic choriomeningitis. Among a number of other compounds tested for activity on the virus of lymphogranuloma venereum ammonium 4-nitrobenzenesulphonate and 4 : 4′-dinitrodiphenylsulphone showed slight activity.

Supplies of lutazol for these experiments were provided by the Roussel Laboratories Ltd. through the Therapeutic Trials Committee of the Medical Research Council, to whom my thanks are due. Dr. A. J. Ewins of Messrs. May and Baker kindly supplied sulphathiazole and sulphamethylthiazole, while for the compound 209/178 I am indebted to Dr. T. A. Henry and Mr. B. Platt of the Wellcome Chemical Research Laboratories.

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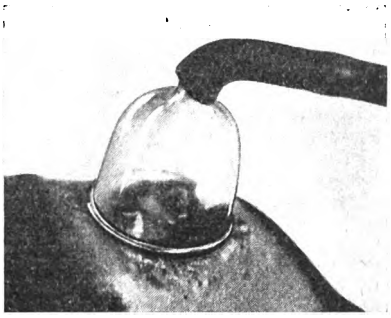
SUCTION FOR CARBUNCLES AND BOILS

By W. I. de Courcy Wheeler, Kt., M.D. F.R.C.S.I.
SURGEON REAR-ADMIRAL, R.N.

Suction in the treatment of carbuncles and boils has been employed by me for many years (see *Med. Annu.* 1932, p. 88). The method is so simple that surgeons have hesitated to draw attention to its merits, and consequently it has escaped the notice it deserves.

The rapid cure of a recent case admitted among the wounded into a naval hospital aroused the interest of some of my junior colleagues and suggested this note. The patient had a severe carbuncle on the back of his neck, with widespread induration, toxæmia, and a high temperature. This is the type of case which responds best to suction. Minor cases do well with almost any form of treatment, including radiotherapy.



The cup applied to a carbuncle on the neck while the patient lies prone.

By the application of suction pus, blood, and debris can be painlessly withdrawn. It floods the tissues with blood and is a simple substitute for the injection of whole blood beyond the margin of induration, as suggested by Carp. No anæsthetic is required, and the procedure is free from risk. To apply suction (see figure) two or three Bier's cupping-glasses of different sizes should be at hand. If the induration of the neck is widespread, it may be difficult to approximate the entire circumference of a large glass closely to the skin. A smaller size is then substituted and placed centrally over the involved area. The glass is connected by pressure tubing to an electric suction apparatus, regulated so that the glass is held firmly in position without causing pain. The strength of the suction is gradually increased until thick pus and blood well slowly into the glass. The process is continued for about five minutes and repeated daily for a few days. Pain is a signal to reduce the amount of negative pressure. After each sitting the patient usually acknowledges considerable relief and asks for a repetition. The slough finally appears in the glass. If a suction apparatus is not at hand, one of the commoner suction cups, such as a breast pump, will suffice, but they cause more pain. Boils are treated in a similar manner.

CRYPTOGENIC PNEUMOCOCCAL SEPTICÆMIA

FAILURE OF SULPHAPYRIDINE

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The following is an example of primary pneumococcal septicæmia, an uncommon condition occasionally seen in young people. The child died of meningitis in spite of the apparent stemming of the blood infection by sulphapyridine.

A girl of 10 was admitted to the Preston Royal Infirmary at 10.35 P.M. on June 23, 1940, having become suddenly ill at 9 P.M. two days before, with shivering, stuffiness in the nose, and, shortly after, vomiting. She had had intermittent nasal catarrh for about two years, but no facial pain or purulent nasal discharge to suggest infection of the paranasal sinuses. In July, 1937, splenectomy was performed after two months tiredness, pallor, and finally jaundice. She made good progress after the operation. There was no history of any similar illness in the family. The day before admission she was confined to bed with headache and delirium; and on

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admission was delirious and vomited several times, but made no complaint of joint pains. She was of slim average build, with a temperature of 102° F., pulse-rate 120, and respiration-rate 26 per min. There was stiffness of the neck and hamstring muscles, and lumbar puncture was performed. Pending the report on the cerebrospinal fluid sulphapyridine (M. & B. 693), 0·75 g., was given at 2 A.M. and four hourly thereafter. The child slept well after morphia gr. 1/8.

The C.S.F. was clear and contained 14 mononuclear cells per c.mm., no excess of globulin or protein (30 mg. per 100 c.cm.); chloride, 750 mg. per 100 c.cm.; normal Wassermann test and gold curve; the specimen was not cultured.

On the 24th herpes was present on the upper lip, the child was conscious all day, but that night was again delirious and vomited clear fluid several times. Movement of the right lower ribs appeared sluggish. Next day she was restless, and in the evening complained of pain in the right knee; the temperature, which had been subnormal for 24 hours, rose again to 100° F. A blood-count showed no anæmia, but 22,400 white cells per c.mm. (polymorphs 70%, lymphocytes 27% and large hyaline 3%). Nepenthe, ℥x, had good effect during another restless night, and there was no further vomiting. On the 26th the right knee was acutely inflamed, with maximal swelling just above the patella, whence 10 c.cm. of thick, pale green, odourless pus was drawn. This yielded a pure growth of type I pneumococci on culture. Radiograms of the chest and right knee were normal. Broth inoculated with 5 c.cm. of blood at 6 P.M. was turbid with pneumococci next morning. The child slept more quietly, but it was decided to increase the dose of sulphapyridine to 2 g. four hourly for 3 days. Next day she was still delirious and the left elbow was painful and slightly swollen. Besides the doses by mouth, 4 g. of the soluble sodium salt was injected during the day. White cells were 28,000 per c.mm. (polymorphs 61%, lymphocytes 37%, and large hyalines 2%). That night the child, though delirious, took fluids well, but next day was incontinent. The site above the right patella was again needled but found to be dry; from the knee-joint, however, 25 c.cm. of thin pale brown odourless pus was aspirated, which (although a few degenerate pneumococci were seen in a film) was sterile, and showed sulphapyridine in the high concentration of 22·2 mg. per 100 c.cm. free, and 33·6 mg. per 100 c.cm. total. White cells were 18,600 per c.mm. (polymorphs 59%, lymphocytes 36%, and large hyalines 5%). After another delirious night blood was taken on the 29th for culture (sterile after 2 days aerobic incubation) and for estimation of sulphapyridine (17·0 mg. per 100 c.cm. free, and 24·6 mg. total). White cells showed little change (19,000 total, polymorphs 70%, lymphocytes 28%, and hyalines, 2%). At 10.30 P.M. the sulphapyridine was reduced to 1 g. four hourly; the child slept soundly, and was much better and fully conscious all next day. This night too she slept well, but vomited at 2 A.M. The temperature, which had risen by steps to 102° F. on June 28, had fallen gradually (together with the pulse-rate) until, on June 30, it was between 98° F. and 99° F. and the pulse between 110 and 130 per minute.

On July 1 the general condition had relapsed gravely; the temperature was 102° F., the child fidgety, with dry tongue, and slightly prominent eyes; the left elbow and the right knee appeared normal, and could be moved actively and fully. The neck could be flexed passively with fair ease. The question of overdose of sulphapyridine was in mind, but it was decided to give Lugol's iodine, ℥xv, in milk by mouth, and a further 3 doses of ℥v four hourly. The white cells had risen to 35,000 (polymorphs 62%, lymphocytes 34% and hyalines 4%). After a restless night the child was in opisthotonos next morning, making irregular convulsive movements of the face and limbs. The temperature was climbing and the white cells were 50,000. Empirically, as an attempt to neutralise the sulphapyridine, 6 c.cm. of 25% solution of nicotinic acid was given intramuscularly, and at noon lumbar puncture was done for the second time. The C.S.F. was turbid, and films showed that the turbidity was due, apart from a fair number of pus cells, to pneumococci. There was an excess of globulin, and the protein and chloride contents were 400 and 800 mg. per 100 c.cm. respectively; sulphapyridine was present in the high concentration of 20·4 mg. per 100 c.cm. free, and 34·8 mg. total. The child died at 2 P.M. and the body was examined three hours later. The child had received 66·75 g. of sulphapyridine during 8 days.

At necropsy the spleen was absent; purulent exudate covered the brain symmetrically from base to vertex; the middle ears were normal; the paranasal sinuses were not examined. The synovial membrane of the right knee and left elbow was œdematous and hyperæmic, but swabs cultured from these sites were sterile; apart from toxic changes the other organs were normal.

We wish to thank Dr. Lois Stent for typing the pneumococcus and Messrs. May and Baker for estimating the concentrations of M. & B. 693.

MENORRHAGIA DUE TO ESSENTIAL THROMBOCYTOPENIA

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OBSTETRICIAN AND GYNÆCOLOGIST TO THE NEWCASTLE GENERAL HOSPITAL

So much has been written about menorrhagia due to the presence or absence of some hormone or other that one is apt to overlook less common causes of the same condition. The following case illustrates one such cause, to which there is only scanty reference in the literature.

CASE-RECORD

A married woman, aged 27, was first seen in the outpatient department of the North Middlesex Hospital on Sept. 24, 1938. She was in comfortable circumstances and had previously been healthy. Her periods had started at the usual age. She had no undue tendency to bleed after cuts and the like. She complained of heavy menstrual losses for 7 days each month, dating from a miscarriage 2½ years before but much worse after the birth of her first living child, now 14 months old; before the miscarriage menstruation had been normal in amount and duration. Of late she had also had low backache and some abdominal pain beginning after each period and lasting about three days. There was a slight intermenstrual discharge, insufficient to incommode her, but no other symptoms.

She was pale, and short of breath on exertion. The lungs, heart, and abdomen were normal, her teeth were unusually good, and the tongue showed no sign of glossitis. There was a small old laceration of the left side of the cervix, with a small erosion; and the right appendage was slightly tender. She was to have been admitted early for investigation, but a few days later she was sent in as an emergency, her period having begun prematurely with unusually severe loss. Apart from the fact that the uterus was slightly more bulky and the cervix softer, there were no changes in the findings. Her spleen was not palpable, nor was there any glandular enlargement. Blood-count: red cells 3,980,000; Hb. 50%; white cells 8950 (polymorphs 56%, lymphocytes 28%, mononuclears 14%); the platelets were very large and few; there was some anisocytosis. Curettage was carried out on Oct. 6; it was confirmed that the pelvic organs were not grossly abnormal. Bleeding then ceased, and microscopical examination of the curettings revealed a well-developed endometrium in the early secretory phase, with large glands; there were many areas of recent hæmorrhage into the stroma. At this time there were only 50,000 platelets per c.mm. The association of a severe platelet deficiency with an endometrium showing no trace of abnormal endocrine influence, and with no pelvic cause of bleeding, suggested that thrombocytopenia was a major factor in her condition. Splenectomy appeared a trifle drastic in the circumstances. A course of iron restored her red cells to 4,500,000 and hæmoglobin to 62%, and she was discharged to the outpatient clinic. Bleeding-time was then 15 min., clotting-time 3 min., and platelets still 50,000.

A course of pentose nucleotide was given to her as an outpatient, 10 c.cm. daily for 5 days, repeated three times at weekly intervals. The sole effect of this was to lower the bleeding-time to 8 min., but the next two periods remained heavy. On Dec. 31 she was losing very heavily and was tired and paler than ever. She was readmitted and remained in hospital for 3 weeks, during which time three separate blood transfusions of 10 oz. each were given from relations. Anahæmin and iron were also administered, and sodium mandelate gr. 15 in capsules thrice daily. During her stay in hospital a normal menstrual loss took place, lasting four days, and about this time she noted a few faint bruise-like marks on her

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legs, possibly purpuric. This was the first time she had ever had any such markings, and they did not recur. She was discharged with red cells 5,000,000; Hb. 80%; white cells 18,000, differential count normal; platelets still only 50,000. During the next three months she reported normal losses and remained well.

She returned on June 26, 1939, looking as washed out as ever, with a story of prolonged and heavy floodings. She was given the choice between splenectomy and subtotal hysterectomy. It was explained that the hysterectomy would free her from her menstrual troubles, but that in the future she might have further purpuric manifestations which splenectomy should prevent. She chose splenectomy and this was carried out by Mr. Ivor Lewis on June 30. The spleen was enlarged to about twice its normal size. The pelvis was free from any obvious disease. Three days after the operation the platelets soared to 300,000, the bleeding-time was 8 min., and other counts were normal. Recovery was uninterrupted, and she was discharged on the fourteenth day with a similar platelet count and a bleeding-time of 4 min. Since then she has remained well; menstrual periods, at first lasting only three days, gradually increased to six days, but the loss has remained normal in amount, and she feels well more than a year after the operation.

DISCUSSION

Textbooks of medicine and of gynæcology do not make it clear that menorrhagia may be the only symptom of a thrombocytopenic state. A few cases have been reported. In an analysis of cases of blood dyscrasia in which menorrhagia was present Kahn (1932) describes 2 cases of latent purpura in which menorrhagia was the only symptom, and 8 others in which it was an important, though not a major symptom. Cases are described by Hartfall and Oldfield (1934), Israel and Mendell (1939), Oldfield (1934) and Myers (1934), in all of which severe menorrhagia was present but was not the only symptom. Splenectomy was successful in all three patients, one of whom was a girl aged 13. Jennings and Castleden (1939) describe a case in which splenectomy did not cure the condition and it was necesssary to irradiate the ovaries. Frazer (1935) describes a case of anæmia with scanty menses in which three months' amenorrhœa was followed by sudden heavy bleeding and purpuric eruptions, with a fatal ending; neither platelet counts nor post-mortem findings are quoted, but the case was clinically one of purpura. Minot (1936), in a paper on intermittent menstrual purpura complicated by increase of leucocytes and fall in platelets, discusses 3 cases in which menorrhagia was present. When my case was under treatment, the work on vitamin P (citrin, hesperidin) was in its early experimental stages, and there was no opportunity of trying its effect.

SUMMARY

A case is described in which menorrhagia was the only significant symptom of a state of thrombocytopenia.

There was no permanent response to any medical treatment, but an immediate and apparently permanent cure was achieved by splenectomy. It is suggested that in a future case the trial of vitamin P would be worth while.

Thrombocytopenic menorrhagia uncomplicated by other purpuric manifestations appears to be uncommon, but a full examination of the blood, including a platelet count and estimates of bleeding-time, should be a part of the investigation of any case of menorrhagia in which an adequate local lesion is not found as a cause, even though other signs and symptoms of a blood dyscrasia are absent.

I am indebted to Mr. Ivor Lewis, medical superintendent of the North Middlesex County Hospital, for permission to publish this case and for his coöperation in the treatment.

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Reviews of Books

Head and Neck in Roentgen Diagnosis

By H. K. PANCOAST, M.D., late professor of radiology in the University of Pennsylvania; E. P. PENDERGRASS, M.D., professor of radiology in the university; and J. PARSONS SCHAEFFER, M.D., professor of anatomy at Jefferson Medical College. London: Baillière, Tindall and Cox. Pp. 976. 69*s*.

THE neuro-radiologist has long needed a standard work of reference and the authors of this book have gone far to provide him with one. Professor Schaeffer is an anatomist, which is a laudable feature, for diagnostic radiology is anatomy, normal or pathological, in vivo. But topographical anatomy has been too rigidly applied. The body has been sawn off at the level of the clavicle and all above has been described; the authors transgress below the clavicle only on one occasion to deal with the thymus. Could they not have allowed themselves a little further licence and followed the spine down to the coccyx? Two-thirds of the work is neuro-radiological; the remainder deals with such topics as the teeth, eyes, ears, nose and throat. Cerebral angiography is dismissed in two pages. Any treatise on neuro-radiology should not neglect to describe in some detail the important work of Moniz and others on the cerebral vessels. Nevertheless, for the most part the subjects are well covered and good bibliographies are supplied at the ends of the chapters. The sections on the paranasal sinuses and the throat are particularly well described. Tomography, or "body-section radiography," is recommended as the method of choice in laryngeal and pharyngeal work, but Lindgren has conclusively demonstrated that straight radiography is as good or better, provided that the technique is beyond reproach. The section on the sella turcica is excellent, but there is one notable omission in the references to the work done on the localisation of intracranial expanding processes—Lysholm's work on the various deformities produced in the ventricular system by expanding processes throughout the cranial cavity. No orderly classification is given and the localisation of tumours below the tentorium is not mentioned. Some scepticism is expressed about the possibility of diagnosis of acoustic tumours on straight X ray. This was certainly not the impression of Lassila, who when working at Stockholm analysed the skiagrams of a hundred or more of Olivecrona's cases and found that over 80% showed a funneling of the internal auditory meatus, which he regarded as pathognomonic of a tumour in the canal.

In so adolescent a science as neuro-radiology it is inevitable that there should be controversy on many points of interpretation, but no-one interested in any aspect of neurology should fail to read this book.

Handbook of Orthopædic Surgery

(2nd ed.) By ALFRED RIVES SHANDS, Jr., M.D., medical director of the Nemours Foundation, Delaware. London: Henry Kimpton. Pp. 567. 21*s*.

THIS textbook appears at an opportune moment, when many young surgeons are undertaking responsibility for bone and joint cases in the treatment of which they have had little training. In a compact manner it covers the whole field of bone and joint surgery, and though a number of isolated statements in it are open to controversy the general conclusions, both as to diagnosis and treatment, are eminently sound, and are based on a study of the work of modern surgical pioneers as well as on practical experience. The first 16 chapters are arranged on a pathological basis, and the remaining 13 on an anatomical one. A valuable chapter deals with those disastrous end-results of fractures which reach the orthopædic surgeon at a stage when they present problems difficult to solve. The author reminds us that such problems can be entirely prevented by properly organised treatment of accidents from the start. In the anatomical section there is a chapter on body mechanics based on Goldthwait's work, and a full study of the "low back pain" which seems so troublesome in America. The book is well illustrated with clear artistic drawings. There are fewer illustrations of simple,

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fundamental types of splint, however, and a young surgeon may find this a serious omission.

The author wisely warns us against the dangers of forcible manipulation under anæsthesia, but it is surprising in a book coming from the land of osteopathy to find no reference to those valuable manœuvres which in the hands of the experienced surgeon provide dramatic relief for the pain of chronic adhesions. The positions advised for ankylosis will be disputed by many surgeons, and it is to be hoped that the advice to amputate a hammer-toe will be omitted in future since its effect on the balance of the other toes is unfortunate. Some more details in describing the technique of common procedures would be desirable. The book ends with a good bibliography.

Guide to Human Parasitology

(4th ed.) By D. B. BLACKLOCK, M.D. Edin., D.P.H., D.T.M., and T. SOUTHWELL, D.Sc. London: H. K. Lewis. Pp. 259. 12*s.* 6*d.*

THE new edition follows earlier ones with little change. In the helminthological chapters emphasis is laid on the growing importance of infection by the adult of *Microfilaria malayi*; and the likelihood of internal autoinfection by strongyloides is noted, though the evidence for this is probably stronger than the new paragraph suggests. There are improvements in diagnostic keys and means of examination; but no reference is made to the added efficiency which Hall's Cellophane swab has given to the detection of threadworm eggs, or direct centrifugal floatation to those of hookworms and other nematodes found in fæces. A footnote mentions that the high incidence of trichinosis in the United States has been established by combining digestion with squash preparations of muscle, mostly got after death. In a future edition it might be well to bring this point out more clearly in the hope that the combined procedure applied in other parts of the world may give equally remarkable results. The statement remains unaltered that *Microfilaria bancrofti* has a nocturnal periodicity in the blood, though in the South Pacific, east of longitude 170°, it is in fact without periodicity.

Chavasse's Advice to a Mother

(10th ed.) Revised by CHARLES C. H. CHAVASSE, B.M. Oxfd. London: Cassell and Co. Pp. 320. 3*s.* 6*d.*

Pye Henry Chavasse (1810–79) was a pioneer among medical writers of popular books on medicine. In this edition his kinsman, Dr. Charles C. H. Chavasse, has revised the work and striven, not without success, to bring it more into line with modern notions. Nevertheless, times have changed and much of the advice given is incurably dated. Not all of us, for example, believe that growing girls of full figure require to wear liberty bodices "for propriety"; or that we should wait for a gumboil to subside before recommending the extraction of an offending tooth; or that tongue-tie (if, indeed, there is such a condition) interferes with an infant's capacity to suck. The book, though likely here and there to alarm young and inexperienced mothers, is a classic of its type. But Dr. Charles Chavasse might have been better employed in giving us a new book of his own instead of revising an old one.

New Inventions

A SIMPLER TOURNIQUET

THE ideal tourniquet should be sure in action and easy to apply. It is desirable that it should also be compact, and that any perishable parts should be easily replaceable. These requirements are fulfilled with either the Finochietto or the Foulis patterns of tourniquet, provided that ordinary rubber tubing is used instead of the special thick rubber cords usually supplied. Moreover, ordinary rubber tubing does not become so hard in texture as to cause unnecessary injury to the soft tissues of the limb. These tourniquets have, however, the disadvantage of being uncomfortable on account of the direct pressure on the skin of the mounts used for fixing the rubber tubing.

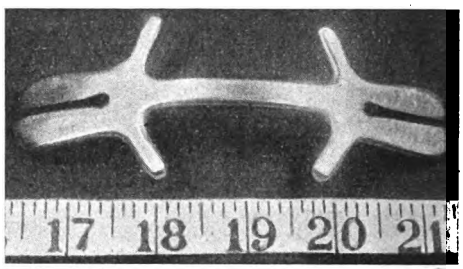

FIG. 1

I have devised a tourniquet which retains the advantages of the Finochietto and Foulis patterns without their disadvantages. The instrument consists essentially of a metal mount (fig. 1) for fixing the ends of the rubber tubing. Two turns are taken round the arm or the thigh with ordinary rubber tubing and the ends of the tubing are anchored in the two slots at the ends of the metal mount (fig. 2). The mount is curved to fix snugly round the limb, but no part of it comes in contact with the skin. The anchor arms behind the slotted ends serve to steady the mount as it lies on the tubing. The tourniquet has given every satisfaction and can be recommended not only for obliteration of the arterial flow but also for constricting the veins when giving intravenous injections. The instrument can be used with any convenient sizes of ordinary rubber tubing. The mount illustrated was made for me locally.

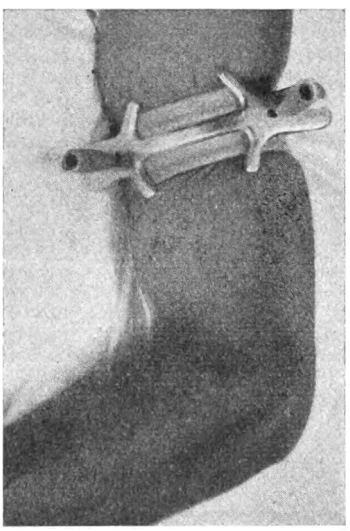

FIG. 2

MILROY PAUL, M.S. Lond., F.R.C.S.
Professor of Surgery, Ceylon Medical College, Colombo.

Infectious Disease in England and Wales

DURING THE WEEK ENDED OCT. 26, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1857; whooping-cough, 1656; diphtheria, 1312; enteric fever, 38; measles (excluding rubella), 11,347; pneumonia (primary or influenzal), 655; puerperal pyrexia, 138; cerebrospinal fever, 149; poliomyelitis, 34; polio-encephalitis, 3; encephalitis lethargica, 4; dysentery, 88; ophthalmia neonatorum, 69. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 1 was 1427, including: scarlet fever, 291; diphtheria, 234; measles, 419; whooping-cough, 38; enteritis, 47; chicken-pox, 144; erysipelas, 32; mumps, 18; poliomyelitis, 2; dysentery, 2; cerebrospinal fever, 23; puerperal sepsis, 5; enteric fevers, 11; other diseases (non-infectious), 76; not yet diagnosed, 85.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 2 (0) from enteric fever, 2 (0) from scarlet fever, 10 (0) from whooping-cough, 12 (1) from measles, 38 (2) from diphtheria, 34 (0) from diarrhœa and enteritis under 2 years, and 23 (7) from influenza. The figures in parentheses are those for London itself.

Leeds and Manchester each reported a death from enteric fever. At Liverpool there were 7 deaths from measles, 7 deaths from diarrhœa and 8 deaths from diphtheria. There were also 4 fatal cases of diphtheria at Birmingham.

The number of stillbirths notified during the week was 215 (corresponding to a rate of 42 per thousand total births), including 13 in London.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 30, 1940

"BYSSINOSIS"

CARDROOM worker's asthma is an occupational disease of, unfortunately, respectable antiquity and has a name which is recognisable by the majority of medical men. In the bill for enabling its sufferers to be compensated for a disability acquired in the course of their work, which was passed without amendment by the House of Commons on Nov. 19, it is replaced by the more impressive term "byssinosis." The only justification for this replacement of the known by the unknown lies in the fact that cardroom worker's asthma by implication limits the disease to operatives in that particular part of the mill. In fact it is not so limited, since workers in the blowing-room, engaged in cleaning the cotton before it passes to the carding engines, suffer to a considerable if not an equal degree, and must also be brought under the terms of the bill. So long as a much belated measure of justice is done to all the workers affected we need not quarrel over a name. The bill has two main clauses. The second establishes a special benefit scheme for the past cases of disability (some 250) which have accumulated and could not be brought within the scope of the Workmen's Compensation Acts. By contributions levied upon every carding machine a fund will be provided to give 10*s.* a week to men suffering from total disability. It is little enough, but will be over and above the disablement benefit available under the national health insurance scheme. The latter continues to be a burden on the funds of the approved society to which the majority of the workers belong, a burden which it has indeed unfairly borne for many years.

The first clause applies the Workmen's Compensation Acts to male workers who have had not less than twenty years' employment in the specified parts of the cotton mill and have become totally incapacitated. Both limitations are clearly very undesirable and are, it seems, based on the difficulties of determining whether a chronic asthma or bronchitis is or is not occupational in origin. The committee of inquiry of 1937–38 laid down that "in advanced cases, where there is total incapacity after not less than twenty years' employment in the cotton-room, blowing-room or cardroom, taking into account industrial history as well as clinical evidence in a particular case, the question can be settled that the workman's disability was occupational." The reasoning is far from clear. If a relatively young man is seriously incapacitated by a chronic asthma after ten or fifteen years in the mill is it really more difficult to assess the probable cause of his disability than when he pursues his work, in conditions from which he should be removed, until his twenty years have run and he is totally disabled? If, in fact, very few cases do develop without long exposure there can be little objection to bringing within the scope of the bill the few unfortunate exceptions, at an age when the clinical evidence should be no less, and may even be more, definite. Mr. GEORGE TOMLINSON, the member for Farnworth, speaking with a long experience of the industry, clearly expressed his dislike of the twenty-year period but bowed to the opinion of "medical science and all the authorities" that it was the least possible time in which they can determine accurately whether the disease is due to this particular dust. It is to be hoped that medical science can find a way of making an exact diagnosis in under twenty years, for, as Sir FRANCIS FREMANTLE suggested, the seeds of the disease must be sown much earlier than that, and men who are seen to be affected should be taken off the work and given another job with some compensation for the injuries they have suffered. Improvements in the proposed scheme are so obviously required that they should continue to be sought until it is possible to remove the risk from dust altogether.

HYPERTENSION AND THE SURGICAL KIDNEY

IT now seems certain that experimental renal hypertension depends on the operation of chemical or humoral factors, the degree of response being perhaps controlled by the endocrine glands. Evidence has pointed to renin as the responsible pressor substance; thus it is found in excessive amounts in the venous blood of kidneys which have been rendered ischæmic either by the Goldblatt clamp or by other experimental means. According to PAGE and his co-workers, however, purified renin is not a true pressor substance. They have produced evidence[1] that renin acts as an enzyme on a substrate ("renin-activator") which is normally present in the blood to produce "angiotonin" which has a strong pressor effect on the peripheral vessels, more lasting than that of adrenaline. Further they have isolated angiotonin as a crystalline oxalate and picrate and find that it is water-soluble, heat-stable, dialysable, and fluorescent, and gives like arginine a positive Sakaguchi reaction. The pressor effects attributable to unilateral renal ischæmia are, however, known to be mitigated by the intact kidney; the normal blood-pressure thus presumably represents a balance reached by the interaction of pressor and antipressor mechanisms initiated by the kidney.

Crude renal extracts have long been said to contain an antipressor substance, but until recently such claims have received scant consideration. PAGE and others[2] now find that extracts either of fresh kidney or muscle given by subcutaneous or intramuscular injection, or by mouth, will reduce arterial pressure in dogs and rats. These extracts when given to eight human subjects with essential or malignant hypertension caused a sharp and prolonged fall in arterial pressure, followed by a rise when the extracts had been withheld for from 3 to 5 days. These observations agree with those of WILLIAMS, HARRISON and GROLLMAN[3] who demonstrated the capacity of renal extracts to inhibit the pressor action of renin and to reduce the blood-pressure in hypertensive rats. These latter workers have now reported[4] the effects of oral administration of renal extracts to a small number of hypertensive patients, two of whom are specified as suffering from malignant hypertension. A considerable fall in the blood-pressure was observed during the period of therapy and this was accompanied by a

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2. Page, Helmer, Kohlstaedt, K. G., Fouts, P. J., Kempf, G. F. and Corcoran, A. C. *Proc. Soc. exp. Biol., N.Y.* 1940, **43**, 722.
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4. Grollman, Williams and Harrison, *J. Amer. med. Ass.* 1940, **115**, 1169.

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subjective improvement in symptoms. Encouraging as these first trials have been a cautious approach to this form of treatment is necessary. As GROLLMAN and his colleagues point out, the desirability of reducing the blood-pressure may be questionable; in their experimental animals vomiting and other toxic effects were observed after treatment. Such effects may be due to some impurity in the extracts, which are admittedly crude. They also point out that the subjective improvement in their patients may have been the effect of suggestion and that further work is needed to exclude the possibility that the declines in blood-pressure were spontaneous. Theoretically the administration of renal extract should be effective only in subjects suffering from hypertension of renal origin. How far experimental hypertension in animals provides the key to the problem of essential and malignant hypertension in man is still undecided, but all these observations have a bearing on the class of case in which a chronic lesion has produced pronounced ischæmia of one or both kidneys.

Sufficient evidence has accumulated to show that hypertension complicating chronic unilateral pyelonephritis may be relieved by removal of the affected kidney. But the incidence of hypertension amongst those suffering from pyelonephritis is not high; BRAASCH and JACOBSON[5] found it to be 26% in 180 cases with chronic bilateral pyelonephritis, while 20% of hypertensives were recorded in a control series of 975 apparently normal cases. Analysis showed the slightly higher incidence in pyelonephritis to be present in all age-groups, and, as with persistent hypertension in general, women were more often affected than men. How far is the association of pyelonephritis and hypertension fortuitous, and to what extent does kidney disease precipitate the onset of hypertension in a person already predisposed to this disorder? This question has been raised by PALMER, CHUTE, CRONE and CASTLEMAN[6] who secured intravenous pyelograms in 212 cases with "essential hypertension" and found abnormalities which they class as important in 47 (22%). In 9 cases the affected kidney was removed, but in only 1 was the hypertension relieved. They contend therefore that "the significance of these figures awaits critical mathematical treatment of the comparative incidence of hypertension and urologic lesions in the general population." They recommend that nephrectomy should be restricted to women under forty-five and men under fifty, since hypertension of unknown ætiology is likely to appear later on. The younger the patient and the more recent the onset of hypertension the better is the chance of a favourable result. Ptosis of the kidney may also be complicated by hypertension but no estimate is yet available of the frequency of this association. In a study of 5 cases MCCANN and ROMANSKY[7] found that the hypertension was relieved by recumbency and that in this posture the renal blood-flow, as measured by the plasma-diodrast clearance and the hæmatocrit, was increased. They have named this condition "orthostatic hypertension." In 2 of their cases nephropexy relieved the hypertensive crises and accompanying symptoms but did not lead to material lowering of the blood-pressure. The wearing of a special belt in a third case had the same result. The effect of posture on the blood-pressure should thus be explored as part of the routine in examining hypertensive subjects, the period of recumbency required being from two to five days.

The association of hypertension with renal tumours acquires a fresh interest when considered in the light of recent work on experimental ischæmia. Compressing tumours might be expected to exert effects similar to those produced by other ischæmic mechanisms, and instances are on record in which hypertension has been relieved by nephrectomy. KOONS and RUCH[8] describe the case of a girl aged seven with a Wilms' tumour of the left kidney which was associated with a blood-pressure of 156 systolic, 126 diastolic. After nephrectomy the pressure dropped to normal and was 116/76 eleven days later. Metastatic deposits were present in the liver and lymph-glands so that the hypertension could hardly be attributed to any secretory product of the tumour cells. KOONS and RUCH thought it was due to the pressure of the tumour either on the renal pedicle or on the kidney as a whole from involvement of the perinephric tissues. To what extent venous obstruction may pave the way to hypertension is uncertain. In the case just published by PERRY and TAYLOR[9] thrombosis of the inferior vena cava and both main renal veins complicated whooping-cough in a boy of nine and was followed by gross hypertension ending in heart failure four years later. Autopsy revealed extreme atrophy of the left kidney and hypertrophy of the right. Survival of this right kidney was determined by a patent aberrant vein which entered the vena cava above the level of thrombosis. Whether the hypertension was due to the destruction of the left kidney or to the interference with circulation in the right remains an open question.

DEAD OR ALIVE?

CONSIDERING the time and energy that man has expended in encompassing the death of his fellow creatures it is curious that he has evolved no precise means for determining whether any particular entity is alive. The man in the street, or to be up to date the man in the shelter, would probably disagree with this statement, but every biologist from the Greeks onward has recognised the difficulty of defining the attributes of life. The whole question has been raised again by the discovery that certain of the plant viruses are composed of heavy proteins, which in some instances can be obtained in the form of crystals. Are these crystals living or dead? One attempt to escape the difficulty has been to say that at the level of organisation of the heavy proteins the terms living and dead have ceased to have any meaning, while the older biological dicta that reproduction, irritability and movement are the main criteria of the living are now hardly tenable without qualification. Reproduction, as exhibited by bacteria, the lowest form of life now universally accepted, has a direct parallel with the rate of increase of one product in a non-living, autocatalytic reaction. The bacterium acts on a culture medium to produce more bacteria while the chemist says that an autocatalyst acts on

5. Braasch, W. F. and Jacobson, C. E. *Proc. Mayo Clin.* 1940, **15**, 481.
6. Palmer, R. S., Chute, R., Crone, N. L. and Castleman, B. *New Eng. J. Med.* 1940, **223**, 165.
7. McCann, W. S., Romansky, M. J. *J. Amer. med. Ass.* 1940, **115**, 573.
8. Koons, K. M. and Ruch, M. K. *Ibid*, p. 1097.
9. Perry, C. B. and Taylor, A. L. *J. Path. Bact.* November, 1940, p. 369.

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another substance to produce more of the autocatalyst. The type of curve obtained by measuring the rate of increase of bacteria is precisely similar to that of the growth of tobacco mosaic virus in the tissue of *Nicotiana tabacum* or to the increase of an autocatalyst in an autocatalytic reaction. The velocity of such a reaction goes on accelerating because one of the products of the reaction acts as a catalytic agent, as for example the reactivation of trypsin by enterokinase. Reproduction in its simplest form is, therefore, not a reliable character for separating the living from the non-living, while irritability, if conceived as a reaction to external stimuli, is of even less value since inanimate objects respond implicitly to outside forces such as temperature, magnetism, contact, light and other factors in the environment.

In an attempt to reach some conclusion in regard to the character of the virus proteins GRAINGER [1] attempts to show that they are not completely at the mercy of their environment. Thus certain plant viruses do not produce symptoms at all temperatures at which their hosts will grow, although virus is present in the tissues; in addition the virus protein may have a temperature of optimum activity which differs from that of its host. It is also suggested that the movement of the virus in the tissues of the host exhibits some degree of autonomy. Tobacco mosaic virus inoculated into the epidermal cells of the tobacco plant can later be recovered from all parts of the plant, the rate of travel being too great for an explanation in terms of diffusion. In addition tobacco mosaic virus can move and multiply within a tobacco leaf severed from the plant and kept in a humid atmosphere. If the inoculation is made at the tip of the leaf the virus advances in a wave down the leaf; it may, in fact, be detected in the lamina of the leaf before it occurs in the mid-rib. Similar results can be obtained with detached stems, the virus spreading upwards and downwards at about the same rate. Red ink it is said behaves quite differently and if inoculated into the leaf is not transferred to other parts. It is therefore suggested that the virus possesses autonomy to a certain degree. Before this view can be fully accepted the movements of viruses in relation to electric charge must be taken into account, for so long as viruses—and the same is true of dyes—are negatively charged they can readily pass up blotting paper although at their isoelectric points there is, of course, no movement. In addition to those considered by GRAINGER there are two facts which suggest that the virus proteins are endowed with certain of the attributes of life. If the purified protein of tobacco mosaic virus is inoculated into tobacco plants and tomato plants the virus will of course multiply in both hosts, but the resulting virus protein will be the same in both cases. In other words the virus protein is able to select the particular compounds that it requires and to synthesise its own specific substance from different substrates. The second argument concerns the capacity of viruses to undergo sudden variation or mutation while the environment remains the same. The sudden appearance of yellow tobacco mosaic lesions in addition to the ordinary green ones is well known. A similar phenomenon has occurred in the Shope rabbit-fibroma virus and in the yellow-fever virus.

1. Grainger, J. *Nature*, 1940, **146**, 539.

In the fourth century B.C. Aristotle wrote that the transition from the living to the dead was a gradual one; we have not yet had time to prove him right or wrong.

SULPHONAMIDES APPLIED LOCALLY

THE use of sulphonamides in the prophylactic treatment of potentially infected wounds is already widespread, though there is no common consent as to how they exercise their protective effect. Either there is a local bacteriostatic action, or the sulphonamide is absorbed into the general circulation and acts as it would if given by mouth or injection. Herrell and Brown [1] have observed concentrations as high as 2·5 and 3 mg. per 100 c.cm. in the blood of patients who had received no more than 1·6 g. of sulphonamide in suspension administered locally thrice daily in the treatment of infected thoracic cavities. Such concentrations, however, were observed only when the sulphonamide had been used in body cavities with a large absorptive surface, such as the pleura or peritoneum. In other localities the amount in the blood was too small to be detected by ordinary methods. They consider that the clinical response of infected wounds to local application of these compounds is far greater than might be expected from the blood concentrations attained. In his account of the treatment of war wounds in France J. S. Jeffrey [2] records a favourable impression of the prophylactic treatment of wounds with sulphonamide packs. The quantity of powder used depended on the size of the wound, and where the track could not be fully laid open a satisfactory mode of treatment lay in the insertion of from 5 to 15 g. of sulphonamide with the assistance of the simple pump introduced by Colonel Colebrook. Unfortunately the catastrophic nature of the campaign made record-keeping and the arrangement of control series impossible, and further work alone will establish the claims of this line of treatment. Jeffrey found no evidence that sulphonamide alone and without operation saved any case of true gas gangrene, but it was helpful in combination with serum therapy. He considers that a sulphonamide can be usefully applied before encasing a compound fracture in plaster; Herrell and Brown share this opinion and have treated a wide variety of infected wounds locally with sulphanilamide; though their results have not been uniform, they consider them sufficiently encouraging to continue the practice. They prefer a thick suspension prepared by adding 2 g. of powdered sulphanilamide to 100 c.cm. of a 0·8% solution of sulphanilamide in normal saline. They apply this thrice daily and have been pleased by the response of infected wounds involving the pleural cavity. The results appeared to be equally good whether the infection was streptococcal, staphylococcal or pneumococcal. A controlled investigation is urgently needed now to show whether these optimistic impressions can be supported by figures.

Dr. ANDREW TOPPING has been appointed deputy medical officer of health and deputy school medical officer to the London County Council.

Colonel THOMAS SINCLAIR, emeritus professor of surgery at Queen's College, Belfast, and pro-chancellor of Queen's University, has not long survived the resignation of his seat in the British Parliament. He died on Monday in Belfast at the age of 81.

We regret also to announce the death on Nov. 21 of ROBERT MAITLAND BEATH, radiologist to the Royal Victoria Hospital, Belfast.

1. Herrell, W. E. and Brown, A. E. *Proc. Mayo Clin.* 1940, **15**, 611.
2. *Edinb. med. J.* November, 1940, p. 727.

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Annotations

VOLKMANN'S ISCHÆMIC CONTRACTURE

THE relation of Volkmann's contracture to injury is well established. D. Ll. Griffiths's[1] explanation of the series of events leading to the contracture links the condition with the complications of arterial ligature as expounded by Leriche and Werquin.[2] An analysis of 32 cases attending the various Manchester hospitals over a period of twenty years shows that injury preceded the contracture in 29 cases and arterial embolus in 3. Of the injuries, supracondylar fracture was the commonest (12 cases) and fractures of the shaft of the radius and ulna next (11 cases). Other lesions were represented by single cases only. The fact that the condition does occur, even in a minority of cases, as a sequel to arterial embolism suggests an arterial origin for the traumatic cases. Malposition of the fractured ends, exerting pressure on one or more of the important structures at the elbow, is probably a factor in a large proportion. Griffiths found that 52% of established cases showed malunion, with forward displacement of the upper fragment. Acute flexion of the elbow-joint exaggerates the effects of pressure in supracondylar fracture of the humerus. Tight splinting and bandaging have also been blamed, but there is no very good evidence that this can in itself produce the contracture. Griffiths reports 28 cases in which splinting or bandaging had been definitely too tight and none of which had developed contractures. Of the 32 cases of the contracture, only 8 had a history of tight splinting. Volkmann's contracture has been attributed to trauma of nerves, veins and arteries at the elbow. The histological change in established cases has been compared with that seen in muscles after damage to their nerves, veins and arteries.

Volkmann's contracture has a well-marked pathology; the change in the muscle is in the nature of an infarction, with fibrosis around the muscle bundles; the flexor mass does not look like muscle, but is represented by a yellowish-green mass, the centre of which is hard, homogeneous and cuts with difficulty, and this necrotic muscle is surrounded by dense fibrous tissue. Histologically, the two main features are the absence of nuclei in the muscle-fibres, and the fact that all cellular activity and all fibrosis occurs at the periphery of the dead muscle mass. But in muscle atrophy or contracture after denervation or sepsis there is interfibrillary fibrosis which is never seen in Volkmann's contracture. Clinically it is possible in many cases, though not in all, to demonstrate associated peripheral nerve lesions; but in any case, the difference in the histology strongly suggests that nerve injury is not the cause of Volkmann's contracture. Griffiths considers that the theory of venous obstruction is completely at variance with findings at operation. The venous return is said to converge on the deep median vein lying beneath the fascial roof of the antecubital fossa where it could in theory be obstructed by a subfascial hæmatoma. Extravasations have been found at operation beneath the skin and in the torn muscle, but nowhere were they very large or very tense; the finding of a hæmatoma under the fascia of the antecubital fossa has been rare. Evidence of arterial injury in the acute stage seems to be much better established, and this, Griffiths considers, is the primary event. The main artery is damaged, probably directly by the sharp bone-end, and local sympathetic reflexes arising in the damaged artery lead to a spasmodic contraction of the collaterals which interrupts the blood-supply to the muscles. If the ischæmia is severe and lasts long enough the muscle is irretrievably damaged and contracture is the result.

In all cases of injury at or near the elbow-joint or in the forearm clinical evidence of interference with circulation must be sought and sought early. Where the radial pulse is absent, the hand blue or cold and the movements of the fingers painful or difficult, all pressure must be relieved. If reduction is complete, and there is no evidence of pressure by the fractured ends; and if placing the arm in a sling at right angles is not rapidly followed by restoration of the circulation (as shown by return of the pink colour and warmth to the hand, and in most cases by the return of the radial pulse), then operation should be done. The brachial, radial and ulnar arteries must be displayed; a trapped artery may possibly be freed, but if this release does not restore the circulation papaverine may be injected intravenously; if this fails, the damaged part of the artery should be excised between ligatures, great care being taken to preserve the collateral circulation. This excision acts by abolishing the sympathetic impulses causing spasm in the collaterals. The operation is likely to be successful if undertaken early. Griffiths reports success after six and after five hours.

1. *Brit. J. Surg.* October, 1940, p. 239.
2. *Lancet*, Sept. 7, 1940, p. 296.

CHRONIC CYSTIC MASTOPATHY AND CANCER

DOES the presence of chronic cystic mastitis in a woman indicate an increased liability to cancer of the breast? Opinions on this question among both pathologists and surgeons have differed, as opinions will when supported only by individual impressions. However, in the last few years reliable data have been accumulating so that a trustworthy answer ought soon to be forthcoming. Experiments on animals have proved that there is at least a relationship between cystic mastitis and cancer of the breast, for œstrogens given in sufficient amount and long enough are apt to cause both conditions. This does not mean that œstrogens are the sole cause of mammary cancer; it has been shown that another factor is essential—namely, "susceptibility to mammary cancer." Vague as this term may appear it has a definite biological meaning. In a suitable animal, given the factor of susceptibility, œstrogens will cause mammary cancer; without the added factor they will not. In certain circumstances the factor of susceptibility can be transmitted from one animal to another. Thus the presence of chronic cystic mastitis in a woman, while it does not necessarily presage cancer, at least means that she has been subject to one factor in the causation of mammary cancer—a supply of œstrogen which is excessive in relation to the responsiveness of her mammæ. Her family records—the only guides—may be too meagre to tell us whether she is likely to be susceptible to mammary cancer or not. Therefore, in a mixed population of which some members possess this obscure factor of susceptibility the presence of chronic cystic mastitis in any individual must, it appears, be a bad omen.

Warren[1] had obtained the after-histories of 513 patients who had been treated in Boston hospitals for chronic mastitis and had undergone partial or complete removal of the affected breast. The average follow-up period was 9·3 years, and during this time twenty-five mammary cancers were recorded in the group. Warren compares this incidence with the mortality-rate for mammary cancer in women over thirty living in Massachusetts. Obviously the cancer incidence will equal the total of cured and non-cured cases, and to make the comparison fair a number must be added to the mortality-rate to represent the cancer patients who have been successfully treated. To provide for this, and also for any cases omitted from the mortality returns through faulty diagnosis, Warren estimates the annual incidence-rate as twice the mortality-rate. Even with this generous allowance for therapeutic successes the cases of

1. Warren, S. *Surg. Gynec. Obstet.* 1940, 71, 257.

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chronic mastitis still show an excessive liability to cancer of the breast. This is the more noteworthy because many of the patients had undergone partial or complete removal of one breast and might have been regarded as thereby protected to some degree from the subsequent development of cancer. As a basis of comparison Warren uses risk-years, that is the number of women multiplied by the average follow-up period in years. The relative cancer incidence obtained in this way works out as 0·12% for all the Massachusetts women over thirty, and 0·37% for those who had been treated for chronic mastitis. When age-specific rates are used, he says, the incidence of breast cancer for women aged from thirty to forty-nine with chronic mastitis is 11·7 times the rate for the general female population of Massachusetts, and in the group of mastitis patients over fifty years is 2·5 times as great as that in the general population. The risk as shown by these figures does not, he thinks, warrant bilateral mastectomy in every case of chronic mastitis, but it does mean that after local operations for this condition a careful and periodical watch should be maintained on the mammæ.

Dr. Warren's findings certainly suggest that the question with which this annotation began should be answered in the affirmative.

THE GIFTED CHILD: WHAT WILL HE BECOME?

THE speech-day bore who says it isn't always the boys who take the prizes that make their mark later (and adds that he never got a prize) is probably as wrong as he deserves to be. Prof. L. M. Terman's investigation,[1] begun in 1922, of the careers of more than 1300 gifted children cuts the ground from beneath his feet. A school population of nearly a quarter of a million was sifted to find this brilliant band, all of whom had intelligence quotients of 140 or over. They were assessed on intelligence tests, school achievement, character, personality, interests, anthropometric measurements, medical findings, and the ratings of parents and teachers. They were found on the whole to be physically superior to the average and to score higher in character and personality tests; and they were versatile, usually achieving a high level in all school subjects. Sixteen years roll away, and in 1936 we find Professor Terman and his field-workers scrutinising them again. Mortality-rates and insanity-rates have been lower among them than among others of their age, but the suicide-rates are about the same. Nearly two-thirds have married, the proportion being about equal for men and women; 40% of the men and 50% of the women have married college graduates; and, though the experimental subjects have a higher intelligence score than their spouses, their spouses have a higher score than the average, so that the matings have been appropriate. Among the 500 offspring available up to date the mean intelligence quotient is 127—showing an expected regression towards the average. The original experimental subjects, even those who have not been particularly successful so far, have maintained their high level of intelligence; it was as easy to spot exceptional ability in their schooldays as it is at 30. The incidence of professional degrees among them is perhaps twenty or thirty times as great as in the general population, though presumably the difference would not be so startling if they were matched against a control group from their own schools. The women, although they equalled or excelled the men in their schooldays and through college, tended to fall out of competition later; domesticity swallowed them up. Professor Terman therefore confined his estimation of success or failure to the men. Three psychologists examined the records of 600 of them, and working independently judged the success in life of each. They classified them into the most successful fourth, the middle half and the least successful fourth, and called the three groups A, B, and C. Of group A, 98% had entered college and 90% had graduated; the corresponding figures in group C were 70% and 50%; half of group A but only 10% of group C had won scholarships, fellowships, or assistantships. These differences were not due to intellectual factors, which were much the same in the two groups. The case seems to be in line with the story of the talent in the napkin; group C had not made full use of the equipment which nature had provided, but the reasons for their failure varied. In some families the tradition of achievement is a stimulus; fathers of group A were more commonly professional men than those of group C. Then there were three times as many Jewish subjects in the A as in the C group, and the tradition of achievement among Jews is high. Emotional stability and social adjustment were higher in the A group, and the A's chose more intelligent mates than the C's; divorce was three times higher in the C than the A group. Success therefore seems to have been associated in this series with emotional stability, absence of conflicts and a happy temperament. On the other hand, Professor Terman does not expect that many of his subjects are likely to set the Hudson on fire. In sheer intellectual ability he believes they compare well enough with many of the eminent persons of history, but he does not think they include a Newton or a Shakespeare, and suggests that "the personality factors which make for ordinary achievement under ordinary conditions are different from those which make for eminence of a superlative order." This seems to give everybody a chance.

1. Presidential address to the Pacific division of the American Association for the Advancement of Science. Published in *Science*, Oct. 4, 1940, p. 293.

CHEMOTHERAPY AND ANTIBODY-FORMATION IN PNEUMONIA

THE natural crisis of lobar pneumonia is believed on good grounds to be intimately associated with the development of specific antibodies to the infecting pneumococcus. Similarly, the critical fall in temperature resulting from the use of antiserum is rightly regarded as being due to an excess of specific antibody. With sulphapyridine, the drop in temperature and the general amelioration of symptoms in patients treated early in the disease cannot be attributed to antibodies, and the question arises whether specific antibodies do in fact develop in drug-treated patients. The studies of McIntosh and Whitby[1] showed that in mice experimentally infected with pneumococci and treated with sulphapyridine immunity to subsequent infection was of the same order and developed about the same time as that obtained in mice inoculated with a killed vaccine of the pneumococcus. Perrin Long, on the other hand, was less sure about the immunity of experimentally infected and cured mice. In the human infection the tendency to relapse when sulphapyridine is stopped too soon and the delayed resolution often noted in patients treated with the drug (Anderson and Cairns[2]) suggest that the antibody response may be poor or delayed. Clinical studies on the subject are rather contradictory. For example, Kneeland and Mulliken[3] using the precipitin test for the demonstration of antibody in the serum of recovered patients found that only 4 out of 19 cases of lobar pneumonia treated with sulphapyridine gave positive reactions, the antibody becoming evident about a week after the fall of temperature. Fox and his colleagues[4] used the Sabin agglutination technique and found that all of 50 cases of pneumococcal lobar pneumonia developed agglutinins at some time in the course of their illness; in the uncomplicated cases the average

1. McIntosh, J. and Whitby, L. E. H. *Lancet*, 1939, 1, 431.
2. Anderson, T. and Cairns, J. G. *Ibid*, Oct. 12, 1940, p. 449.
3. Kneeland, Y., Jr., and Mulliken, B. *J. clin. Invest.* 1940, 19, 307.
4. Fox, W. W., Rosi, R. and Winters, W. L. *Amer. J. med. Sci.* July, 1940, p. 78.

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time of appearance was 8·3 days after onset of infection, and in the complicated cases 12·5 days. The late appearance of agglutinins was usually associated with some complication or delayed resolution. It is reasonable to suppose that early treatment of pneumonia with sulphapyridine would damp down the antigenic stimulus to antibody-formation by preventing continued proliferation of the pneumococcus, and there is some support for this belief in McIntosh and Whitby's finding that mice infected with 100 lethal doses of pneumococci and saved with sulphapyridine were not nearly so immune to subsequent infection as were those injected with 100,000 lethal doses and saved in the same way. It therefore seems that patients with pneumonia who are being treated with sulphapyridine require to be protected against late relapse either by continuance of the drug to cover a period of 7–10 days from the onset of infection or by an artificial supply of antibody. The antibody may be given curatively as specific antiserum and both Anderson and Cairns and Lord, Robinson and Heffron[5] have advocated the combined use of serum and drug for pneumonia in certain specified conditions. The alternative is to use a vaccine of the homologous organism not so much as an adjuvant remedy, as was suggested by McLean and co-workers,[6] but as a preventive of late relapse and perhaps delayed resolution.

In pneumonia treated with sulphathiazole there is a less prompt fall in temperature with a corresponding longer period of infection.[7] This phenomenon may be correlated with the findings of Kneeland and Mulliken[8] in a second paper where it is shown that in sulphathiazole-treated cases of pneumonia specific antibodies appear earlier and in a much higher proportion of cases (16 out of 21) than in patients given sulphapyridine. Their evidence thus confirms the conclusion of Gaisford and Whitelaw that sulphapyridine is a more potent antipneumococcal drug than sulphathiazole.

PROGNOSIS IN SACRO-ILIAC DISEASE

THE outlook for the patient with sacro-iliac tuberculosis has not been reassuring in the past. Apart from the immediate danger to life, the disease seemed likely to condemn its victim to a life of chronic invalidism. H. J. Seddon and F. G. St. Clair Strange[9] have dispelled the gloom to some extent. Their opinion is based on a series of cases more extensive and more carefully studied than any preceding it. They consider the outlook good in all cases that are not complicated by associated tuberculous lesions in other organs; and the isolated lesion, without sinuses, they regard as almost a benign disease. Recovery is the rule and enables the patient to return to full work within 5 years without fear of relapse. Granted sound healing, pregnancy is not contra-indicated. Seddon's series is drawn from three main areas of England—Oxfordshire, Lancashire and London. The results are so different in the different areas that some local factor had to be sought. The best figures come from Oxfordshire, where the case-fatality rate is but a fraction of that of Lancashire. Moreover in Oxfordshire a smaller proportion of patients came for treatment already suffering from tuberculosis elsewhere than in the sacro-iliac joint. Seddon's explanation is that the organised series of clinics, of which the Wingfield-Morris Hospital is the centre, ensures earlier diagnosis of the disease and protects the patients against improper treatment of abscesses before admission to hospital. "The net that catches them" is more efficient than in either London or Lancashire.

Sacro-iliac tuberculosis differs from other forms of joint tubercle in being commonest between the ages of 16 and 35. The younger cases do better than the older, and the children best of all. Advanced age is the main single factor in raising the fatality-rate. When the disease is fatal death is likely to occur in the early stages. Seddon's figures show that if the patient has lived for 5 years his chance of ultimate survival is excellent; and after 6 years the fatality-rate is negligible. Three clinical types are recognised—the closed isolated lesion, the isolated lesion with sinuses, and the lesion associated with tuberculous foci elsewhere. Next to advanced age, associated lesions are the main danger to life. Death may be due to meningitis (often only a terminal event), to pulmonary disease, nephritis or generalised tuberculosis; lesions of the spine are present in a fair proportion of cases. Cases with such associated tuberculous foci show the high fatality-rate of 55%, as compared with 10% for cases with an isolated lesion without sinuses, and 25% for those with an isolated lesion with sinuses. The task of the surgeon is to prevent, as far as lies in his power, the formation of sinuses, and to search his patient for associated foci. All patients with sacro-iliac tuberculous lesions should have radiographic examination of the chest, whether or not there is clinical evidence of lung involvement. The sedimentation-rate should be watched; any considerable rise points to a possible major complication. Periodic examination of the urine for tubercle bacilli should be carried out, even in the absence of suggestive symptoms. Seddon insists that in treatment time must be no object. The older methods of eradication and excision failed to arrest the disease and produced an appalling series of deformities. Fusion operations are soundest, and Seddon shows that they can produce a firm ankylosis, the only satisfactory end-result. Conservative treatment, under modern methods, is also followed by lasting ankylosis and so far no results have been produced which decide the relative merits of the two forms of treatment. The average period of hospital treatment is 18 months and it is not materially altered by operation. During the first year after leaving hospital most patients were unfit for full work; during the second to the fifth years strength and confidence were regained, and most of them returned to full labour, some of them even to the occupation of mining. At the end of the fifth year almost every patient was hard at work. Seddon's conclusion is that after recovery from sacro-iliac tuberculosis there is little or no permanent incapacity for either work or sport.

THE LONDON HOSPITAL

WE stated last week (p. 667) that the medical college of the London Hospital was to be established at the Essex County Hospital, Colchester. We are now informed by the dean of the London Hospital medical college that this statement is without foundation and that the facts are these. The headquarters of the medical college are and will remain at the London Hospital in Whitechapel. The preclinical school was removed to Cambridge at the beginning of the war and will remain in Cambridge. The number of beds available at the London Hospital is at present 300; senior students are working there and at sector hospitals nearby. Systematic teaching is in progress at the London Hospital during the present winter session. Junior clinical students spend the first six clinical months at Chase Farm Hospital, Enfield (800 beds), where the teaching of pathology has also been organised. Intermediate students in the second clinical year are scattered over a number of sector hospitals where facilities for medical education exist and where clinical material and clinical teachers are available. Ten clinical students have been temporarily attached to Essex County Hospital, Colchester. There has at no time been any suggestion of moving the medical college to Colchester, and we regret that so misleading a statement should have appeared in our columns.

5. See *Lancet*, Oct. 5, 1940, p. 422.
6. McLean, I. H., Rogers, K. B. and Fleming, A. *Ibid*, 1939, **1**, 562.
7. Gaisford, W. F. and Whitelaw, W. *Ibid*, Oct. 12, 1940, p. 451.
8. Kneeland and Mulliken, *J. clin. Invest.* September, 1940, p. 735.
9. *Brit. J. Surg.* October, 1940, p. 193.

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GENERAL MEDICAL COUNCIL

PRESIDENTIAL ADDRESS

OPENING on Tuesday the 152nd session of the council Mr. H. L. EASON spoke with appreciation of the way the administrative and domestic staff had carried on their work under hazardous conditions with no loss of efficiency. He explained why the present session was being held as usual. The High Court of Justice was still sitting in London; workers in all factories had been urged to carry on their work notwithstanding air-raids, and he felt that members of the council would wish to face whatever risks there might be with equal determination. He alluded to the death since their last meeting of two former members of the council. Prof. William Russell had represented the Edinburgh College of Physicians for the twenty years 1913–33. He was one of the four members who survived from 1914–18 to the outbreak of the present war. His quiet manner but resolute mind were highly appreciated on the council. Mr. F. J. Steward had represented the Royal College of Surgeons 1932–36. Endowed with more than usual shrewd and hard-headed common sense he served the council effectively with the minimum of unnecessary speech. He went on to regret the retirement of Prof. Waterston, who represented the University of St. Andrews from 1930. He was a wise and tactful colleague, vigilant to secure punctilious observance of standing orders. In his place he welcomed the appointment of Dr. Daniel Fowler Cappell, dean of the faculty of medicine and professor of pathology, whose extensive knowledge of the problems of medical education would be of value to the council.

WAR-TIME EXPANSION OF THE MEDICAL REGISTER

Since the last meeting of the council, the President continued, a defence regulation (32B) has been passed which enables practitioners legally entitled to practise in any territory outside the United Kingdom to which the regulation is applied, or in any part of that territory, to be temporarily registered in the colonial list or in the foreign list of the Medical Regist r (as may be appropriate) for a period not longer than the period of the present emergency, if it is shown to the satisfaction of the council that the practitioners fulfil the prescribed conditions. The regulation is to be applied to territories, and the conditions of temporary registration are to be prescribed, by orders made under the regulation by the Minister of Health, the Home Secretary, and the Secretary of State for Scotland, acting jointly. On Sept. 14 an order was made by the ministers applying the regulation to each of the provinces of Canada and to the United States of America. The order prescribes as conditions of temporary registration that applicants

(1) shall be British subjects or citizens of the United States;
(2) shall be of good character;
(3) shall hold a medical diploma or diplomas granted, as the case may be, in a province of Canada or in the United States which is recognised for the time being by the council for the purpose of the order as furnishing a sufficient guarantee of the possession of the requisite professional knowledge and skill.

The way is thus opened to our colleagues in Canada and in the United States who wish to give practical expression to their belief that our country's cause is their cause by placing their professional services at the disposal of the authorities here so long as the em rgency lasts. The defence regulation and order are important in the history of medical legislation in that by them a condition intermediate between that of being unregistered and that of being registered (subject to the operation of certain sections of the Act of 1858) for life has been defined. These measures give additional powers to the council during the present emergency, and provide an admirable precedent for similar emergencies in the future.

RECIPROCITY WITH ITALY

An end has been put, by an order in council of Oct. 11, to the reciprocal relations with Italy which were entered into in 1901, nearly forty years ago. The history of the negotiations which led up to the establishment of these relations, and of the circumstances which preceded their severance, is too long for me to relate now. The right of persons whose names have been already entered on the foreign list of the Medical Register by virtue of recognised diplomas granted in Italy is, in accordance with subsection (2) of section 17 of the Act of 1886, not prejudiced by the new position; but I may permit myself to say that for the greater part of the long period during which reciprocity with Italy existed in name she was taking privileges far more extensive than any that she gave.

POTATOES

POTATO hunger is widespread; few of us feel we have had a proper meal in the day unless potatoes have appeared at least once on the plate. In a discussion on the potato as food, held on Nov. 13 by the nutrition panel of the food group of the Society of Chemical Industry, with Mr. André Simon (president of the Wine and Food Society) in the chair, this universally admired tuber was examined critically and came out of the ordeal with fresh lustre. Its percentage constitution, which was summarised during the discussion by Mr. L. H. Lampitt, D.Sc., is:

Water ..	68–81	Sugars	0 2–0 8
Starch ..	12–18	Pectins	0·2–0·8
Total nitrogen..	1·7–2·6		

The content of starch can be varied by selection and cross fertilisation and German workers have produced potatoes containing as much as 25–40%. The protein content which accounts for only half the nitrogen is a globulin called tuberin; the remaining nitrogen is present as histidine, lysine, arginine, tyrosine and possibly asparagine and leucine.

Storage does not affect the nitrogen but increases the sugar content owing to the breakdown of starch. Enzymes present in the potato include phosphatase, oxidase, catalase and tyrosinase; the last is believed to convert tyrosine into melanin in the presence of air and so may be responsible for causing the blackening during cooking which sometimes occurs. Cooking causes the cells of the potato to separate and disintegrate, turns the starch to jelly, degrades the pectins and coagulates the proteins. The agreeable brown colour of the fried potato is due to the conversion of the surface sugar to caramel.

Mr. R. N. Salaman, D.Sc., F.R.S., director of the Potato Virus Research Station, mentioned that potatoes have probably been cultivated for two or three thousand years and men have learned to choose frost-resisting types and those which yield heavy crops. Unlike vegetables raised from seed, such as turnips and cabbage, the potato is propagated by the tuber itself and that ensures that the stock never reverts to a poorer or simpler type. Unfortunately it is the butt of several enemies: a fungus causes wart disease, and another fungus blight; virus diseases are conveyed to it by the green-fly, and the annual loss from virus disease in Great Britain amounts, he said, to 30% of the crop or about two million tons, worth £15,000,000. This can be avoided, he holds, by using virus-free potato seed; without increasing the acreage under potatoes, it would thus be possible to increase the crop by nearly a third. Different qualities in a potato are needed for different purposes: the caterer wants a potato not too insipid or too pronounced in flavour; it must boil well and fry well and not absorb too much oil in cooking. A potato which boils well is not likely to be a good fryer.

Dr. Salaman's reflections were later supplemented by the chairman, who gave the following advice on boiling potatoes: the mealy potato should be put into boiling water, the waxy potato into cold water which must then be brought to the boil. There is no need to wait until a fork can be put into the cooking potato; when it is half done the water should be poured off and a cloth should be put over the top, the potatoes being left to cook in their own steam. Miss Harriette Chick, D.Sc., also had a word to say about cooking potatoes; she knew no evidence to support the belief that the goodness of the potato is in its skin. By boiling potatoes in their jackets the water-soluble constituents are conserved, which otherwise diffuse out, but there is no other advantage. Its nutritive qualities are such as to make it a partial substitute for bread, which it resembles in calorie and carbohydrate content. Its protein content is less but is of good quality; it contains as much available iron and phosphorus as white bread, though less than wholemeal.

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When potatoes are eaten alone about 5 6% of the total calories and 15% of the nitrogen remain undigested, but when eaten with bread or meat the residues are less. Potatoes are an important source of vitamin C not because they contain a great deal of it, but because they are eaten so freely. They are among our national anti-scorbutics during the winter when fruit and vegetables become scarce. They contain as much vitamin B_1 as wholemeal bread and the vitamin-B_2 content compares with that of meat. Fat content of potatoes is negligible, and there is a corresponding absence of vitamins A and D.

PREJUDICE AND THE EAR-PLUG

MANY people seem to encounter difficulties when they try to use ear-plugs; others have adopted them readily. The Wartime Social Survey found that 13% of people living in Shoreditch had bought ear-plugs by late September, 1940; the Mass-Observation social research organisation found in mid-September that the figure for 5 London boroughs was also 13%. According to the Mass-Observation inquiry between the start of the war and the third week of air bombardment about 1 person in 8 bought ear-plugs in heavily bombed areas. At this time (before distribution of free ear-plugs had been arranged) there were adequate supplies in most stores, and prices were reasonable. About half of those who had bought plugs had used them, and used them regularly, usually every night. The other half (250 people studied) almost without exception had not used the plugs at all after an initial attempt. They disliked them, sometimes violently; but among the regular users there was strong enthusiasm. Many of those ready to try them found them initially unpleasant. It took some people a week or more before they could get used to using plugs, even when they were keenly anxious to do so. Some people who have got completely used to wearing plugs while they are awake and put them in as soon as the sirens go, continue to pull them out of their ears while they are asleep, and some even throw them across the room.

This investigation and others have shown that a primary factor in producing strain and lowering morale is the noise of bombs and guns; and as one of our peripatetic correspondents pointed out (*Lancet*, Nov. 2, 1940, p. 566), listening for the noise is of more importance than the noise itself. A large proportion of those losing sleep or suffering from strain were found by Mass-Observation to be listeners—people who listened for the plane coming, or for the bomb swishing, often without being able in any way to improve their position or increase their safety if and when they heard something. To such people, especially women, the very idea of ear-plugs was repugnant. Being in expectation of possible death, they did not want to be taken unawares. The commonest objection to ear-plugs is contained in the phrase "I might miss something." But people in this frame of mind would probably benefit greatly from the use of effective ear-plugs; indeed, those who have overcome their objections and taught themselves to use plugs admit it. At the present time the need for plugs in London is not so great as it was in September, or in October when free plugs were distributed. This is reflected in the figures for sleep obtained in regular surveys of 5 London boroughs.

Date	No sleep %	Less than 4 hrs. %
Sept. 19	24	77
Sept. 26	7	43
Oct. 6	3	23
Oct. 16	5	17
Oct. 30	0	7
Nov. 10	0	7

These figures are open to the usual sampling errors, but they reflect a trend back towards normal hours of sleep after an early period of major dislocation. In the provinces the process of acclimatisation is probably not so well advanced.

The prejudice against ear-plugs raises a problem of permanent significance. When, in early October, the Ministry of Home Security made a free issue to the whole population, it took few steps to overcome these illogical objections. However efficient the plugs might be, simply issuing them was not enough to make everybody use them. A study made by Mass-Observation during the free issue in a London borough showed that for every 3 people who said they would use or try the plugs 7 said they would not. The Ministry of Home Security clearly stated that the plugs were not intended to give physical protection—their function was to "reduce the crash and concussion of explosives" and to "prevent the shattering effect of noise on the nerves." To issue ear-plugs which do not give physical protection is a thoughtful and agreeable gesture, but cannot hope to be successful in the teeth of the strong tensions and prejudices of a highly individualistic people. Energetic propaganda is required to make the plugs appear desirable—simple instructions, drummed in through several channels, explanations, and illustrated leaflets. In the heavy cost of producing ear-plugs for everyone, 1% might have been allotted to a campaign to put the principle across. You cannot take by storm the sometimes ill-informed but genuine and usually sensible feelings of that three-quarters of the population which left school before it was fifteen.

In England Now

A Running Commentary by Peripatetic Correspondents

THESE are strange times for those who were family doctors in the older "residential districts" of London. We had probably the pleasantest kind of town practice. Cultivated folk of moderate means with a house and some children and one servant or two made up the best part of our clientele and on the whole proved themselves intelligent, loyal and grateful towards their doctors. By way of variety there was a sprinkling of richer and poorer people, and domestic servants made grateful and usually unexacting panel patients. Like any other practice it had its irritating features but it was a good kind, and it is gone. Even before the war our nicest patients tended sooner or later to move into the country and live there, and their houses were divided into "maisonettes" or replaced by blocks of flats. Life in town was becoming more difficult, life in the country easier for the professional classes. They were not whole-hearted Londoners. They loved the country and their summer holidays and sooner or later the week-end cottage became their permanent home. Still, until the war there were enough of them to keep us alive. Some went but some stayed and a few even came in from the provinces. But at the first puff of the blast of war they went. Not of course all, but a large proportion of people with families left their houses and were gone or never came back from their summer holidays, and the wailing sirens of the first few days, though nothing came of their prophecies of woe, drove out many more. Their servants have gone with them—though it is odd how their medical record cards linger behind—and all that ministered to them, booksellers, chemists, schoolmasters, highbrow cinemas, music makers, teachers and sellers, have followed them if they can. We had our warning at Munich-time and sure enough it happened. Whether if the war had gone otherwise they would have come back does not now matter, what is certain is that the pleasanter parts of London have been seriously depopulated. Empty houses and flats stare bleakly at us in every street; closed shops, cinemas and private schools tell the same tale. There are people in plenty to be seen about, but our practices as we knew them are gone, and we have an uneasy feeling that "take them for all in all we shall not look upon their like again."

Our case, of course, is not universal. In the country general practice must be going strong, and even in London there are those who fear that air-raids will keep their patients at home and thus multiply visits and that they will be hard put to it to squeeze their day's work into the short winter day. They may prove wrong because I fancy many of the mildly sick will just lump it. Our common folk have a great deal of passive courage and patience though sadly little initiative. But be that as it may, it would take a very lively epidemic to make us busy here—that is, so far as practice is concerned—and yet it is not easy for us to abandon what is left and to lend a hand where there is more to be done. The doctor

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must work from a base, he cannot usefully be sent like guns or soup kitchens to meet a local need. Mere redistribution would not solve the problem. What, then, are we to do? Some are gone into the Services but most sit tight and look for second strings to their bows. Happy is the man that hath at least one, if not his quiver full of them. The trouble is they so soon stretch and sag. Recruiting boards were a good-seeming string for many and we rose at summer dawn and drove ten miles to sit on them, worked hard and saw all the medical curiosities generally reserved for the higher clinical examinations. But it seems we have "done" the recruits—or nearly done them. Then there are school-children. There was for a little time a quite considerable stream of children registered for evacuation to be inspected and it was entertaining to read in one of your esteemed contemporaries that the school medical service of London "was idle because the schools were largely closed." Actually it was just then working seven days a week and recruiting outside help, but soon the stream became a trickle and the trickle dwindled to a drip though because, for understandable reasons, it is decreed that each several drop shall be seen on the day after it registers even the drip method of evacuation fills the inspecting doctor's time. It is not uncommon to spend 2½ hours in visiting three widely separated schools and to see five children among the lot. Next, may be, we shall find ourselves conducting some kind of clinic or dispensary in the bowels of the earth among the deep-shelter dwellers. What will be the end of it God knows, but I expect we shall worry along, and if we prove reasonably adaptable neither we nor our children will starve.

* * *

Driving out to a midder case in a distant village the other night, half asleep, my body just emerged from the cocoon-like warmth of bed, my mind dreamt with envy of the good old days when man, obeying the restrained instincts of the animals, amid dancing and rejoicing did his mating in the spring, so that woman could bear the child in the inactivity of the winter when the nomads came to rest. We could have got all this midder business over in what—a month or six weeks? Then ten or eleven months clear. Co ldn't we suggest . . . . Curse this mist, it's getting thicker and there is a dyke on each side of me; careful now, no dreaming. But why the deuce should he want to mate in the spring? Half starved on winter rations, devitaminised, detanned, what sort of children will he beget in that state? How infinitely preferable to wait until the autumn, when the summer's sun is still glowing in our skin, and the berries and fruits of the earth are giving us health and strength. That would bring the confinement season to mid-summer. Splendid! We ought really to start a society. . . . Careful, careful, there's a bad corner coming, just by the pool where the water-violets bloom in June. You know you are not driving as fast as you could. You are using this mist as an excuse for slow driving; at the back of your mind you have a hovering fear of midder, of some abnormality, a dental presentation or twisted triplets, something which will expose your ignorance, or make you act quickly, which would be most uncomfortable for you in your present dreamy state. You know you'll be as pleased as Punch and overbearingly civil to the relatives if it's a B.B.A. You seem to forget there is a woman in pain who needs your help—or thinks she does, poor mutt. You are driving faster now only because you want to convey to the village an impression of dash and speed, of the energetic conscientious doctor. That mist you came through will be a thick fog when you talk to the midwife. A psychologist would call you an escapist. Damn the psychologist. Which is the cottage anyway?

* * *

Some day a LANCET Commission might be set up to inquire into the habits and customs of the medical profession as touching the employment of leisure. Doctors have a deservedly high reputation for the cultivation of elegant pastimes. In particular, there is a high proportion of medical men with a love of music, and not a few who can give a good account of themselves on the cornet, flute, harp, sackbut, psaltery and dulcimer. One of the most interesting phenomena in Liverpool is the sight of a former professor of surgery making his way down Rodney Street for his weekly lesson on the 'cello. For my own part I prefer the fiddle. The ideal of "an hour a day" is difficult of attainment now that I have undertaken to put the baby to bed of an evening (one must see one's offspring sometime, and preferably in the nude). However, with a few introductory remarks on Pavlov and conditioned reflexes I persuaded my wife to allow me to combine the two activities. It was with some pride that I was able to report that the infant went to sleep within a quarter of an hour of my tuning up. "There's one thing about it," commented my wife thoughtfully, "if he can sleep through that it's certain that the sirens won't disturb him." My humiliation was complete when I read in THE LANCET leader on safeguarding sleep that "Noise alone does not keep people awake once they have had a little time to recognise that it has no importance for them."

* * *

During the past couple of years I have been engaged on a small clinical problem that has a bearing on old age. I have found an abundance of clinical material in the public-health institutions. The other day, following up my investigations on an old man, I remarked while standing at the bedside, "He's seventy-two, I see, Sister." "Ninety-two" the patient interjected, seriously offended. I smiled indulgently, and looking at the chart over the bed I said, "Your age is given on your card as seventy-two." "Yes, doctor," explained sister, smiling in her turn, "but that card was made out twenty years ago."

* * *

In September, 1939, I was evacuated with part of my hospital to a small town called Beerchester, forty miles from London. I spent four months there wondering why we were not recalled to London, since all was quiet there in those days, and in the end we went back. Eleven months later I returned to Beerchester, this time of my own inclination, because all the patients had gone to the country. Last year the journey was quite an adventure. Driving down on the first night of the blackout on a late summer evening was rather thrilling; it was setting off into the unknown with a burning hope that we were going to deal with hundreds of casualties and get plenty of surgical experience. Of course, nothing happened, but like everybody we enjoyed the "flap" and momentary self-importance. Beerchester was in a furore that warm summer evening, being a mobilisation centre for the Army. The streets and pubs were full of soldiers enjoying their mobilisation grants—our first job later was to sew up the rents they had made in each other as a result. Later the town filled with busloads of children from London who all arrived on a market day. Children, animals and market stalls made a good mixture. The war in those days was a joke—the Germans would rebel before Christmas and the French would invade Germany while we slept. After a week of settling in we found that the town was really very quiet and when the soldiers left we were almost the only foreigners there. The four months passed uneventfully.

October, 1940, was different. The evacuation was premeditated. There was no burning hope of masses of surgery, but just a small one that we might see an ordinary case instead of all the air-raid stuff. Six weeks in London helping with the casualty service had almost convinced us that the student is superfluous in a London hospital casualty clearing station. He is too proud to carry stretchers and not qualified to sign a death certificate. The day I came down to Beerchester it was raining. The country was bleak and dripping, the trees were bare and it was generally pretty gloomy. The town itself was full of wet, pushing, shoving, irritable refugees. It looked like a picture of an Eastern market. There were fewer cars about and many more bicycles. The shops were full of people trying to buy things which had run out. No cigarettes, chocolates or sweets. The people from London overflowed from the pavements into the road and made driving difficult. Many of them slept in the town hall and all the small houses of the villages around were crowded with other unfortunates. The hospital, which last year was only two wards and a lot of Ministry of Health theory and plans, had materialised to a considerable extent. Now there were a lot of beautiful green huts full of patients, many of them from the teaching point of view quite good. It was rather a shock to see this small hospital housing so many students—last year we were 25, this year 75. However, there are about three or four patients each; not bad these days.

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Letters to the Editor

THE SICK IN BOMBED AREAS

SIR,—It seems clear that unless bombing becomes a frequent day-time affair or increases very greatly by night—both I sincerely hope unlikely—there will never be the swarm of wounded civilians so confidently expected, and the vast provision for them will probably never be needed unless we are successfully invaded. But lots of people this winter will be ill and will need nursing and rest in bed and medical treatment and ought to be provided for. If I were Mr. Morrison I should commandeer plenty of sites where buildings lately stood, clear out and roof in their basements, perhaps replacing the rubble which makes an excellent bolster, reconnect their drains, gas, water and electric light and make them into little cottage hospitals (or medical wards) for the use of the neighbouring G.P.s. We show so far almost no tendency to take advantage of the opportunities of war and turn ill to good, but here is one. Fritz has cleared any number of sites by knocking the buildings down and any number of houses by frightening their tenants away. Why don't we use them? We don't want big shelters or big hospitals—they are dangerous in every way—we want lots of small ones, and everyone ought to know how comfortably you can live under a ruin; we all did it in France. Fit up some of the basements as surgeries and others as small medical wards, supply cooks, cleaners and nurses from the women's organisations and let the doctors do the doctoring.

COCKNEY.

MALARIA ON BOARD SHIP

SIR,—The letters from Dr. Hutton and Colonel Napier in your issue of Nov. 9 are of considerable contemporary interest. Ever since the outbreak of war and the consequent adoption of the convoy system there has been a constant stream of severe infections of subtertian malaria in merchant seamen and passengers finding their way to the port of London. All of them appear to have contracted their primary infection in the harbour of Freetown, Sierra Leone. It will be remembered that the same occurred in transports towards the close of the last war.

It seems from an extensive experience of this class of case that some of our previously conceived ideas may have to undergo revision. Given a favouring wind and other conditions, virulent subtertian malaria may be contracted in any location in Freetown harbour, however far distant from the shore. In some of my cases the actual stay there has been less than twelve hours, and they appear to have contracted the disease by having been bitten by infected anophelines which must have been blown aboard, though many do not remember actually being stung. In some instances deaths have occurred on the voyage home, and the sad point is that the possibility of malaria has not always been recognised by medical officers who have had no previous experience of this extremely puzzling fever; but most of the fatal cases have occurred on vessels which do not carry a doctor on the strength. Subtertian malaria may assume so many clinical guises that one should suspect it in every case of sudden illness arising ten days or more after leaving the West Coast of Africa. The algid or afebrile cases in which gastric or intestinal symptoms predominate are the most deceptive, and I have found that it is in these instances that quinine is apt to be withheld. If the principle were to be adopted (and I believe it is being done now) of exhibiting quinine or Atebrin to every suspicious case in the absence of a microscopical diagnosis (which usually cannot be performed on board ship), then these extremely regrettable fatalities could be avoided. In cases with cerebral symptoms, delirium or coma, intramuscular injection of quinine should be unhesitatingly given.

Another point I should emphasise is that on routine examination of travellers returning from West Africa scanty subtertian parasites (in the ring form) may often be found in the blood when there are no signs of ill health, splenomegaly or history of fever, and it is just these symptomless cases which may culminate in a fatal attack shortly after arrival in this country. Based upon these experiences I have for several years past been advocating a prophylactic course of atebrin (0·3 g. daily for seven days) during the voyage home, as the customary prophylactic dose of quinine gr. 5 is not sufficient. This is admittedly a very simple procedure, unaccompanied by unpleasant results, and since the adoption of this rule by several West African trading companies the incidence of severe cases of subtertian malaria and blackwater fever in their employees has entirely ceased.

A product identical with atebrin is now being manufactured in this country under the pharmacopœial name of mepacrine hydrochloride. The combination of quinine and atebrin in the treatment of these severe cases of subtertian malaria has in my hands given consistently good results.

Harley Street, W.1. PHILIP MANSON-BAHR.

PSORIASIS UNCONQUERED

SIR,—Your annotation of Oct. 19 (p. 496), and the article by Dr. John F. Madden which inspired it, betray an ignorance of all that clinical observations, to say nothing of laboratory investigations, have taught us about psoriasis. Although there is little positive evidence to support it, the view that psoriasis is a specific disease caused by an undiscovered micro-organism, virus or other, is perhaps defensible; but the more one studies the disease, or rather those who are afflicted by it, the more likely does it seem that it is a non-specific reaction of the skin of certain persons, comparable to eczema and urticaria, the tendency to which is inherited in about 30 per cent. of cases. If this is true, it is just as absurd to talk of a "cure" for psoriasis as it is for asthma, eczema, or rheumatism. It is a question of what will cure Mr. A's asthma or Mrs. B's psoriasis.

At a joint discussion[1] by the sections of physical medicine and dermatology of the Royal Society of Medicine two years ago Dr. Elizabeth Hunt adduced arguments for regarding psoriasis as a non-specific allergic reaction of the skin and, if we consider the arthritis of rheumatic fever and of rheumatoid arthritis as articular allergic reactions, this view is strengthened because of the undoubtedly close association between the psoriasis of childhood with rheumatic fever and that of adult life with rheumatoid arthritis (psoriasis arthropathica). In my own opening paper read at the same meeting I tabulated what I consider to be the chief factors in the ætiology of psoriasis, and emphasised that in the light of our present knowledge successful treatment depends upon a consideration of the probable provoking factors and upon complete investigation in each individual case. This is true of all non-specific diseases. I pointed out that the treatment of the sufferer from a specific disease, such as syphilis, malaria, or diphtheria, is with certain reservations cut and dried, whereas every patient with some non-specific (or apparently non-specific) disease presents a separate problem, since the same symptoms may be evoked in different cases by factors which at first sight have nothing whatever in common. Different methods or drugs are employed for the treatment of a specific disease, and such treatment is modified with increasing knowledge or as a result of new discoveries. Since the cause of the disease is always the same, no matter what the age, sex, habits, or constitution of the patient, a comparison of the effects of the various methods or drugs in vogue may usefully be made, provided the number of cases is sufficiently large to enable one to draw accurate conclusions. In my opinion, however, this is not so in non-specific diseases except as regards the temporary control of this or that symptom. It is justifiable, for example, to attempt to determine in what proportion of cases adrenaline will control asthmatic seizures or outbreaks of urticaria, or the efficacy of different topical applications in eczema or psoriasis. But the blunderbuss method employed by Dr. Madden in 112 cases of psoriasis without any regard for the probable causative factors in the different patients seems to me a waste of time. It teaches us nothing.

As for your annotator's remark—"Probably the time-honoured method of applying an unguent containing tar to the patches . . . and of giving him a small dose of arsenic by the mouth is still as good as anything"—I will

1. *Proc. R. Soc. Med.* 1938, **31**, 708.

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only say that it indicates a lack of clinical observation and deduction that is astonishing. A few considerations based on observations of actual cases will, I trust, demonstrate its futility.

(1) When psoriasis appears for the first time in childhood, there is in the majority of cases an evident association with a streptococcal infection of the throat, the streptococci being of the hæmolytic type. The eruption often breaks out like an acute exanthem after an attack of tonsillitis or scarlet fever, and it should be noted that there is the same latent or "silent" period between the throat infection and the appearance of the psoriasis as there is between the former and the onset of arthritis in rheumatic fever. The eruption, of course, often persists in chronic form into adult life, and in such cases one almost invariably finds a chronic infection of the throat with a hæmolytic strain of streptococcus. Effective treatment of this infection will in most instances permanently cure the psoriasis.

(2) When, however, psoriasis appears for the first time in adult life, the same multiplicity of provoking factors that prevails in the "rheumatism" of adults is observed. In both conditions there is a group of cases in which focal streptococcal infection is unquestionably the principal causative factor, and I have had cases of psoriasis in which successful treatment of a chronic infection of the urinary tract with *B. coli* was followed by permanent disappearance of the eruption. On the other hand, both in rheumatism and psoriasis, infection may apparently play no part whatever, while metabolic errors may be present, such as gout. Psoriasis in middle-aged or elderly gouty persons, who are often obese and alcoholic, presents certain special features. It often involves chiefly or exclusively the flexures, it is usually very itchy, the patches are intensely congested and may ooze with serum either spontaneously or when the scales are scraped away. All these features are in direct contradistinction to those of psoriasis as usually met with. Under a suitable dietetic regime, abstention from alcohol, and the administration of large doses of alkalis, the patches become pale, the serious oozing and itching cease, and the eruption gradually disappears. The fatuity of treating a case of this kind by the method advocated in your annotation, or in the same way as (say) a child with an acute outbreak of guttate psoriasis following tonsillitis is obvious.

(3) Pustular psoriasis of the extremities, which may or may not be accompanied by ordinary psoriasis on other parts, and the so-called pustular bacteride are closely related ætiologically and as regards the characters of the pustules. Both are due to focal streptococcal infection, the main source as a rule being in the tonsils. Which type of eruption is provoked by such an infection would appear to depend upon whether or not the patient is an actual or potential psoriatic. In pustular bacteride the eruption is eczematous in type, whereas in pustular psoriasis it is clinically and histologically psoriasiform. The pustules in both cases are sterile and are evidently due to circulating streptococcal toxin coming from the focus or foci of infection. That the same cause should provoke an eczematous type of reaction in one person and psoriasis in another is further evidence for the non-specificity of the latter disease.

Devonshire Place, W.1. H. W. BARBER.

PREGNANCY TESTS IN WAR-TIME

SIR,—Both rabbits and mice which are commonly used for pregnancy tests are kept on foodstuff which, in the interest of economy, might now be saved for more important animals. At a time when the rabbit itself has become of importance for human consumption, and while laboratory supplies are often difficult to obtain, we might do well to remember that pregnancy tests can equally well be done with the aid of the South African claw-footed toad (*Xenopus lævis*), an animal which needs a little scrap meat once a week only and which is not killed in the course of the test. While in reliability the xenopus test equals that of the Zondek-Aschheim or the Friedman method it has the advantage of always yielding a result within 24 hours. The results of over 800 tests done on over 5000 animals have shown me that, without exception, positive tests indicate the existence of pregnancy. I have shown that xenopus can be bred in this country, although this is admittedly more difficult than the breeding of rabbits or mice. New supplies of xenopus from South Africa have, however, so far not failed to arrive and there is at present no reason why we should sacrifice rabbits for pregnancy tests or go without such tests in cases where they might be of diagnostic importance.

Regent's Park, N.W.1. R. E. ELKAN.

COMPULSORY IMMUNISATION

SIR,—I have read with much interest Dr. Cunningham's stimulating letter and would state that with the exception of immunisation against tetanus of "civilians exposed to the risk of recurrent injury" (unless these are covered by a definition of A.R.P. volunteers and A.R.P. full-time personnel) my authority is already carrying out all his suggested compulsory safeguards to public health on a free voluntary basis.

To his list of diphtheria, whooping-cough, smallpox, the typhoid group of fevers, and tetanus immunisation I should, however, like to add "compulsory cleansing." In a recent examination of 4411 of my school population, preparatory to evacuation under plan IV, exactly 300 children were found to be verminous. Complete delousing in a short time of this number was only possible by utilising a team of nursing auxiliaries, working under the direction of the health visitors and school nurses, who undertook the cleansing operations at the first-aid post. A.R.P. vehicles waited outside the schools, where the medical inspections were being held, to convey the children to and from the post. These vehicles on the return journeys delivered notices to parents that the children had been taken for cleansing.

If we are eventually to live in communal deep shelters, facilities for cleansing, whether compulsory or otherwise, are likely to be essential. May I add that I think Dr. Cunningham will find that public-health departments have already issued instructions to the general public concerning the protection of water-supplies where there is the least suspicion of damage to the supply or to sewers.

Public Health Department, Erith. REGINALD LEADER.

SIR,—Combined immunisation against tetanus, the typhoid diseases and diphtheria has been compulsory in the French army since 1936, and it is recognised that the immunising effect of each vaccine is increased when they are given together. In the British army immunisation by tetanus toxoid and T.A.B. is on a voluntary basis, but has been accepted by 80% of the armed forces. Not one of the wounded who had been immunised has developed tetanus, and it is probable that the protection afforded will be permanent. This is a total war, in which the whole nation is involved, and casualties have been much more numerous among the civilian population, including women and children, than among the troops. Surely as much protection should be given to them. In addition to the ever-present danger of death or mutilation by enemy action, there is the more insidious but very real danger of decimation by epidemic diseases, which might spread like a prairie fire among the children crowded at night in the large underground shelters. Wholesale immunisation of civilians against typhoid and tetanus was strongly urged in your leading article of June 15, and in Dr. Cunningham's letter of Nov. 16; and Sir John Ledingham has stressed the importance of prophylactic immunisation of all young children against as many of the serious diseases of childhood as is possible (*Brit. med. J.* 1939, 2, 841).

Why is the benefit of active immunisation against tetanus and typhoid only given to the regular armed forces and not extended to the Home Guard, the police, firemen, A.R.P., demolition workers and the like, who of all civilians are most exposed to danger? On Nov. 5 Mr. Law, financial secretary to the War Office, said, in reply to a question by Dr. A. V. Hill, "in no case has tetanus been reported in wounded soldiers who had received protective inoculation. All the reported cases have occurred in non-immunised men. With regard to T.A.B. immunisation . . . on the basis of the figures I have given, the chance of contracting typhoid or paratyphoid is increased roughly by 17 times by refusing inoculation. In no other army is typhoid immunisation not universal." On Nov. 7 Dr. Hill asked whether in

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view of the successful results of the new inoculation in the Army against tetanus the same protection could not be offered to the police, the fire services and the air-raid precaution services in general. Mr. Herbert Morrison replied that "his department and the Ministry of Health had concluded that special measures of advance immunisation against tetanus should not be extended to the services mentioned. An adequate safeguard was afforded by the normal method of inoculation." The inference is that, although full protection by the modern method of active immunisation should be given to the regular Forces, the obsolete method of passive immunisation of the wounded by antitoxin, with its many and obvious disadvantages, is considered good enough for those who risk their lives to protect the lives and homes of their fellow citizens.

Compulsory immunisation of civilians, and especially of children, in those areas which are most subjected to aerial bombardment is the only really effective precaution against the spread of serious epidemic diseases, but there seems little prospect of its adoption at present by those responsible for the public health.

Worthing. HERBERT H. BROWN.

ZIPP IN THE TREATMENT OF WOUNDS

SIR,—In a previous letter (*Lancet*, July 6, 1940) I reported on the use of "zipp" in the treatment of wounds and compound fractures. For ten years I have used almost no other method for accidents and animal maulings and can now report on 2 war wounds treated by a colleague with this method. Zipp is, of course, merely a modification of Rutherford Morison's bipp, consisting of zinc oxide 1 part, iodoform 2 parts, and liquid paraffin 2 to 3 parts, mixed to the consistence of clotted cream. Its advantages over bipp are that with zipp there appears to be no risk of iodoform poisoning, though it is for chemists to explain why zinc oxide prevents iodoform poisoning whereas bismuth subnitrate often fails, and bismuth poisoning obviously cannot occur. Moreover, zipp appears to stimulate healing and to have a beneficial systemic influence.

CASE 1.—Injury caused by bomb explosion. A lacerated wound 9 in. by 4 in. on inner aspect of the left forearm with much damage to soft tissues and compound comminuted fractures of radius and ulna. No pulse at the wrist. Amputation seemed to offer the only hope of saving life; the patient, however, refused operation, but finally consented two days later to toilet of the wound under anæsthesia. After limited debridement the open wound was packed with gauze heavily impregnated with zipp, and the limb was encased in plaster-of-paris, which was changed at three-weekly intervals. Ten weeks after injury the surgeon noted: "Firm union; hand clawed; wound clean and superficial." I saw the patient a week later; he was in excellent condition, and no smell except a faint aroma of iodoform emanated from the plaster. When this was removed the wound was found to be superficial and clean, surrounded by epithelialised scar tissue involving two-thirds of the flexor aspect of the forearm. No sinuses. The bones were firmly united; all normal movements of the elbow and wrist-joints could be performed though their range was very limited. The wound was dressed with a bread-and-butter layer of ordinary zinc ointment and a fresh plaster was applied; I expect healing to be complete when this plaster is removed in a month's time. No sulphonamides were given to this patient. Zipp obscures the radiographic picture, so that I have been unable to obtain a satisfactory radiogram of the fractured bones since the treatment was started.

CASE 2.—Injury due to bomb explosion. Lacerated wound 6 in. by 4 in. on outer aspect of left leg; compound fracture of tibia and fibula; 2 in. of lower third of fibula missing. Wound toilet under anæsthesia, flushed with acriflavine, covered with gauze and encased in plaster-of-paris. Sulphapyridine, 2 5 g., was given on the same day. Three days after injury zipp treatment was begun, and the limb was put up in plaster which was changed every three weeks. I saw the patient eleven weeks after injury; his condition was good and there was a smell of iodoform only. The plaster was removed and the wound found to be healing well; it led funnelwise down to the outer aspect of the tibia, but there was no purulent discharge. The tibia was soundly united. The upper end of the lower fragment of the fibula could be seen in the wound and was obviously destined to sequestrate. There was full movement at the knee, which had not been included in any of the plasters, and considerable though limited movement at the ankle-joint. Fresh zipp and plaster were applied.

Chief among the advantages of the zipp and plaster method is the absence of all repulsive smell. In addition, zipp repels insects so that maggots with their threat of anærobic and other infection never invade the wound. The intractable dermatitis which is relatively common with the ordinary closed-plaster technique does not occur, and gauze impregnated with zipp has an enhanced drainage power. Those of us who have used this method are convinced that zipp also has a therapeutic quality. On several occasions I have been able to arrest with zipp treatment cases of suppurative tropical myositis in which ordinary drainage has failed to stop the progress of pyæmia and the development of fresh abscesses. It seems certain that free iodine is liberated when zipp is brought into contact with body fluids because the starch-containing plaster-of-paris encasing the limb is stained deep blue within twelve hours. This staining does not of course occur when a gypsum bandage such as Cellona is used. The free iodine may possibly have a general as well as a local action on the body.

East Africa. W. K. CONNELL.

PNEUMOCOCCAL MENINGITIS

SIR—Squadron-Leader Coleman says in his article of Nov. 16 (p. 615) that the case-mortality of pneumococcal meningitis has been reduced to about 35% by sulphapyridine.

The case-mortality of the *published* cases is about 35%, but I believe the mortality of the condition to be a very different affair. In reviewing the subject (*Brit. med. J.* 1940, 1, 804) I concluded that the mortality was still extremely high. This conclusion was based on the following points:

Since one hospital alone could claim 39 cases in a three-year period, the total number of cases occurring in this country since sulphapyridine was introduced must be considerable. Yet only 14 cases successfully treated since sulphapyridine was introduced could be found, 7 of them having been treated with sulphapyridine alone. There was no reason to suppose that the shortage of published cases was due to reluctance to publish since no such reluctance has been observed with meningococcal meningitis.

The main conclusion of my review was that there was every justification for using much higher doses of sulphapyridine at the outset of pneumococcal meningitis than those usually advocated for meningococcal meningitis in which the prognosis is more favourable. This conclusion was arrived at, first, because 5 cases previously seen and treated with moderate doses of sulphapyridine had all died (a typical case received 2 grammes every four hours for four days), whereas 2 consecutive cases had recovered after treatment with really large doses. Secondly, it was considered that in some of the published cases timid doses had been used early, but an enormous total dose had been given. Thirdly, there was evidence (Maclean, Rogers and Fleming, *Lancet*, 1939, 1, 562) that pneumococci establish a tolerance to sulphapyridine. It was hoped that the principle of using large doses at the outset would save patients who would die on moderate doses, without harming those who did not really need these large doses.

The principle of high initial dosage was justified by the work of Hodes, Gimbel and Burnett (*J. Amer. med. Ass.* 113, 1614) whose results in 17 cases were the best published to date. They used the same large doses as had been used in my 2 successful cases, and 8 recovered completely. It was striking to find that as their experience developed and they took to giving the drug both by mouth and by intravenous injection (so that an adult of 12 stone might receive 34 g. in the first 24 hours) they cured 4 consecutive cases at the end of their series.

I agree, then, with Coleman's conclusion that large doses of sulphapyridine should be used at the outset, but am disappointed that he thinks this principle sufficiently emphasised by the statement that "at least 6 grammes a day should be given to an adult." The adoption of this principle might mean that a patient actually received less of the drug on the first day than the accepted dose for meningococcal meningitis, which is approximately 9 g.

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Hodes, Gimbel and Burnett recommend the following dosage. When the diagnosis is made, older children and adults are given 6–12 g. at once by mouth, and a quarter of that amount every six hours, the full dose being continued by mouth until several successive cultures of the C.S.F. are sterile. In addition a 5% solution of sodium sulphapyridine is given intravenously, starting with 0·1 g. per kg. of body-weight at once and continuing with 0·03 g. per kg. every six hours until two successive lumbar punctures produce sterile C.S.F. They believe that a concentration of 10–15 mg. per 100 c.cm. of C.S.F. should be maintained and were unable to achieve this regularly by oral administration alone.

Norwich. STEPHEN FALLA.

MISUSE OF TANNIC ACID

SIR,—I entirely agree with Mr. Park's objections to your leading article of Nov. 16. My recent experience in the treatment of burns with tannic acid in E.M.S. hospitals in London and the receiving areas has convinced me that painting with 1% gentian violet, 10% tannic acid, 10% silver nitrate, with a further layer of tannic acid, is ideal for all second-degree burns, even of the face and fingers, and for most third-degree burns. The cause of many failures with this treatment are: (1) c eaning and tanning without the use of an anæsthetic; and (2) covering the tan with cotton wool and bandage before it is dry. Several cases which had been treated in London and evacuated to a base hospital were tight'y bandaged and there was much œdema. The bandage and as much of the gauze and wool as possible were removed, a lengthy and pa nful procedure, before the œdema subsided. I either removed all the dressing and repainted the exposed parts of the tan with 5% gentian violet in alcohol, or left some of the dressing incorporated in the tan; both methods gave excellent results. All burn cases should be put on a full course of sulphonamide therapy for at least three days.

The patient is the most important person in the whole procedure. Ask him if he has had any pain after tannic-acid treatment and his answer will nearly always be "No!" Surely that is all that is needed in the way of a testimonial.

Chichester. JOHN GORDON.

IMPROVEMENT IN THE MEDICAL SERVICES

SIR,—It seems hardly fair that Sir Ernest Graham-Little in his letter last week should have attached so much blame to the B.M.A. for the part it played in the construction of the Emergency Medical S rvice at the outbreak of war. In a letter to THE LANCET of April 6 Sir Ernest wrote that the E.M.S. evolved from decisions taken by "(i) The Central Emergency Committee of the B.M.A., later called the Central Medical War Committee; (ii) The group officers of the sectors, constituting a committee of some 19 consultants . . ." Fellows of the Royal Colleges in London would seem to have been well represented in the counsel responsible for the formation of the E M.S. Further than this, we consultants relied on the Committees of Reference of the Royal Colleges of Physicians and Surgeons for the care of our interests in these matters, with result that is known to all of us.

I would not go so far as to say that two blacks make a white, but I am sure that my consultant colleagues will agree that it is bad policy to indulge in recrimination about the past, and I do hope that the Royal Colleges will cooperate with the British Medical Association in its great effort to improve the medical services provided for the nation.

Mansfield Street, W.1. GEOFFREY EVANS.

DEBRIDEMENT

SIR,—Your annotation of Nov. 16 begins by reminding us not to "worry about words rather than surgical principles" and yet ends by suggesting that we anglicise the word *déb idement*, by dropping the accent and the italics and pronouncing it in English fashion. Since there has been so much debate on the meaning of this excellent word, why not drop it altogether? Instead one can use the more extensive and better term "surgical revision," defined by Mr. R. T. Payne, on page 3 of No. 1 of the *Bulletin of War Medicine*, as:

1. Examination of a serious wound under anæsthesia.
2. Determination of its extent.
3. Removal of dead tissue and foreign bodies.
4. Arrest of hæmorrhage.
5. Provision of drainage, if required.

In any case, why attempt to anglicise the word? It came from France, let it remain French. What otherwise should be done with words like *contrecoup, pitrisage, tic douloureux, réduction en masse*? Are we to pronounce them as if they were born in this country? I have still to meet the surgeon whose education prevents his using the words with their true pronunciation. Finally, the author of the annotation, who wishes us to say "de-bride-ment," cannot have foreseen the limerick on page 626 of the same issue of THE LANCET.

Chatham. A. S. PLAYFAIR.

AMERICAN PUBLIC HEALTH ASSOCIATION

"TOTAL national defence" was the keynote of the presidential address given by Dr. W. S. Leathers, dean of the medical school of Vanderbilt University, at the 69th annual meeting of the association held at Detroit last month. The speeding up of the munitions industries will demand the efforts of industrial hygienists; the problems of military and industrial mobilisation involving "migrations and readjustments of millions of people" call for the watchful care of epidemiologists; the coming of a war of nerves makes imperat ve application of our knowledge of the science of nutrition. A special session was called to discuss the control of venereal diseases in a national defence programme. The Surgeon General (U.S.P.H.S.) presided and addresses were given by officers of the Army and Navy on the relationship of the control of venereal disease in civilian populations to the efficiency of the fighting services. The war associations of the last great pandemic of influenza were not forgotten and Dr. Frank L. Horsfall, Jr., reported on a new influenza vaccine prepared in the laboratories of the International Health Division, Rockefeller Foundation. It has been found that a formalinised complex vaccine containing both influenza-A virus and canine-distemper virus effectively immunises ferrets against antigenically different strains of the former virus. In human volunteers, inoculated with a formalinised vaccine made from chick embryos simultaneously infected with the two viruses, neutralising antibodies were produced whose concentration had not diminished three months after inoculation. To what extent these antibodies would protect against natural infection is still unknown. Nor is there any reason to hope that the new vaccine would be effective in influenza due to ætiological agents other than influenza virus A.

At a general session of the association the retiring president, Dr. Edward S. Godfrey, Jr., described the training given to physicians in New York State to prepare them for a career in public health. They come in the first place under the "non-competitive" class of the civil service, for the commissioner does not want mere "examination passers." Candidates must have graduated from an approved medical school and have served at least one year of internship. They then serve an apprenticeship first in the district offices and then in the central state office at Albany. During this period, lasting from 6 to 12 months, the tyro finds out whether he likes public-health work and the officers of the department determine his aptitude for a public-health career. If the experience is mutually satisfactory, and only in that case, the apprentice secures a fellowship to a postgraduate school of public health. The fellows must succeed in passing the examination for a degree in public health if their career with the department is to continue. On their return from the university they enter a civil-service examination in open competition with physicians having other training and education. So far opportunities have not been wanting for public-health graduates who have followed this course of training.

Nearly 3200 members attended this convention. Next year the convention will meet at Atlantic City when Dr. John L. Rice, health commissioner of New York City, will preside.

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Parliament

AN eventful and historic session was brought to an end last week, and a new one was opened by the King in person with all the traditional ceremonial. The Gracious Speech from the Throne expressed in firm but unboastful language the resolution of the British peoples to fight on against the aggressor nations until freedom has been made secure, and forecast with confidence a final British and Allied victory. The Prime Minister's speech in the Commons conveyed the same message. He warned the House and the country that we had still a long road to travel, but he looked forward with confidence and hope to the time when we should be as well armed as our antagonists. A great cheer went up when he added: "Beyond that I look to the time when the arsenals and training grounds and science of the British Empire shall give us that material superiority which added to the loyalty of constant hearts will bring victory and deliverance to all mankind."

Lord Horder on Shelters

In the last hours of the old session, on Nov. 20, Lord ADDISON initiated an important discussion in the House of Lords on hygiene in air-raid shelters. He pressed the Government to publish the report of Lord Horder's committee, and not merely the recommendations, and emphasised the urgency of the matter.

Lord HORDER said that the crux of the problem was overcrowding—large numbers of people in a confined space with, at first, no means of sanitation, no drinking water, no proper facilities for sleep, in close contact with each other, the uninfected in close proximity to the infected. Much had been done, he said, to deal with the problem by implementing the recommendations of his committee, as well as by Miss Ellen Wilkinson's committee, the Shelters Policy Committee. Security and hygiene could not be separated, and the answer to both was dispersal by evacuation and by distribution of shelters and the people who used them. It would be foolish and criminal to say that we were even within sight of the solution of the hygienic problem. He could not therefore give an assurance that the shelter danger to public health had been surmounted. On the administrative side Lord Horder quoted from a minute of his committee which stated: "Although we are aware that some local authorities have realised the danger that confronts them, and have taken steps to avert it, the impression made on the committee by its more recent observations is still profoundly disturbing." The function of his committee, Lord Horder pointed out, was advisory and they had no responsibility for action taken on their recommendations. At the same time they could not be indifferent to what they believed to be the causes which delayed the giving of their medicine to the patient to whom they had been called in consultation. They could not help being struck, for example, by the lack of coördination between the different departments of local authorities resulting in no one official accepting detailed responsibility for shelter conditions. Instructions, too, were often issued to already overworked officials with an inadequate staff. In conclusion Lord Horder hoped that this would not be made a question of political controversy, and said that he was not an apologist for the Government in respect of either what they did or did not do. The only thing that mattered was to get on with this business, to say to ourselves in effect, "I will not sleep comfortably in my own bed until I have done my best to get as much safety, whether it be physical safety or health safety, for the peeple who form the bulk of this great country."

In the debate which followed the BISHOP OF WINCHESTER pleaded for dictatorial powers to deal with the shelter problem and Lord JESSEL emphasised the difficulties of local authorities, the unending responsibilities thrown on officials and the lack of material and labour.

For the Government the DUKE OF DEVONSHIRE argued that the reason why the Horder report had not been published was that there was no single report to publish. When the committee was appointed it began advising the Government at once and the Government were in possession of a number of reports. Lord Horder had also advised ministers verbally. This procedure would no doubt be continued. The Government's aim was to evacuate children to places of greater safety, but they did not intend at present to take compulsory powers. The Government were applying their mind seriously to shelter problems, they were paying attention to Lord Horder's reports, and as far as possible they were carrying them out.—Lord ADDISON, being dissatisfied with this reply, pressed the matter to a division and a motion for papers was only negatived by a majority of 3.

Cardroom Asthma

In moving the second reading of the Workmen's Compensation and Benefit (Byssinosis) Bill in the Commons Mr. PEAKE, under secretary Home Office, said it had long been recognised that workmen who had spent many years in certain dusty parts of cotton mills suffered to a greater extent than the general population from respiratory troubles, chronic bronchitis being the main feature. Their condition had come to be known in the medical profession as byssinosis. During the last twenty years, since the introduction of exhaust ventilation in cotton mills, there had been great diminution in the incidence of this disease, but a committee which recently investigated the question had found that new cases still developed even under present improved conditions. It had been repeatedly urged that these workers should be brought within the scope of the Workmen's Compensation Acts, but there had been two difficulties in the way of applying those acts by the ordinary method of an addition to the list of scheduled diseases—diagnosis and old cases. It had not hitherto been possible for medical practitioners or certifying surgeons to determine with sufficient certainty that the disease was occupational in any particular case. There were also a considerable number of old cases, estimated at 250, which would not be met by merely scheduling byssinosis as one of the industrial diseases under the Workmen's Compensation Acts. For some years the Home Office had been aware of this unsatisfactory situation and had tried to promote an agreement between the two sides in the cotton industry for dealing with it. A committee was appointed in 1937 under the chairmanship of Sir David Ross to consider whether an equitable and workable scheme could be devised for providing compensation for both future and past cases. As a result of the committee's recommendations proposals had been worked out by the Home Office and submitted to both sides of the industry; they were now embodied in the present bill which could to a large extent be regarded as an agreed measure. Clause 1 applied the Workmen's Compensation Acts to male workers who had been employed for not less than twenty years in the specified parts of the cotton mills. Clause 2 established the special benefit scheme for the past cases. In regard to these old cases it was proposed to establish a fund by contributions levied on every carding machine which would provide 10*s*. a week for men suffering from total disability. That benefit would be in addition to anything which the workman might receive under the national health insurance scheme.

Sir FRANCIS FREMANTLE said that not one medical man in a thousand knew what byssinosis was. THE LANCET had recently headed an editorial article on the disease "cardroom workers' asthma," and he protested against the formalism which used the word byssinosis instead, which no-one understood. The death-rate from bronchitis among male cotton strippers was five and a half times as high as among all occupied males and ten times as great as among males in such dusty occupations as cement working and lime burning. That showed there was something specific about this complaint. One of the most prominent workers on this disease under the Medical Research Council had been Prof. Carl Praus itz who had come to this country after being compelled to relinquish his position in the University of Breslau. Sir Francis thought it would be better not to have such a strict limitation as twenty years; when further knowledge was gained they would find that the seeds of this disease were sown much earlier than that. Prevention was better than cure, and men who were seen to be affected should be taken off this work and given other work, being compensated for the injuries they had suffered. There were also objections to the limitation of this scheme to those who had been totally incapacitated. However, he agreed that they had to

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begin in a small way, and must hope for improvements later on.

Mr. PEAKE said he was not competent to deal with the medical technicalities which the answer to Sir Francis Fremantle's points involved. The conclusion of the Ross committee was that they could not at the present moment certify cases of partial disability as being occupational in origin. They further thought that until a man had been employed for twenty years in these dusty portions of a cotton mill one could not say with certainty that his chronic asthma or bronchitis was due to his employment in the mill.

The bill, which had already passed the House of Lords, received a unanimous second reading in the Commons and passed through its remaining stages. On the following day it received the Royal assent.

QUESTION TIME

The Horder Committee

Dr. IRENE WARD asked the Home Secretary if he would give the names of the committee associated with Lord Horder in considering shelter health; and if he would publish the recommendations.—Mr. HERBERT MORRISON replied: The names of the members of the committee are: Lord Horder (chairman); Mrs. Creswick Atkinson, technical adviser, W.V.S.; Sir Wyndham Deedes, chief warden, Bethnal Green; Dr. A. D. Mackenzie, medical officer, Ministry of Health; Sir Alexander Rouse, chief engineer, Ministry of Home Security. The committee have presented both an interim report and a further report, and their recommendations are being published.

Mr. K. LINDSAY asked the Minister of Health why the full report of the Horder Committee had not been published; why there had been a delay of two months between the submission of the report and the publication of the committee's recommendations; and what was the executive machinery for putting the recommendations into practice.—Miss F. HORSBRUGH replied: The Minister of Home Security and the Minister of Health decided that it was undesirable that the enemy should be given all the information contained in the full report. In addition to their initial report, the committee have made a series of recommendations, the last of which only reached us at the end of last week. The executive machinery for giving effect to the recommendations is the local authority responsible for shelter provision, under the general direction of the Ministry of Home Security and Ministry of Health. It would have been inconvenient to publish these in a series of documents, and we therefore waited until it would be possible to publish a comprehensive list of recommendations.

Doctors and Motor-car Lights

Mr. T. E. GROVES asked the Home Secretary whether he was aware that the reduction of lighting on motor-vehicles was seriously impeding doctors in making emergency calls on patients; and whether he would give to doctors at least the same lighting facilities as were available to military, fire services and some other official services.—Mr. MORRISON replied: If you refer to the more drastic dimming of car sidelights which has recently been imposed, I would point out that at the same time permission was given to motorists to continue to use their masked head-light after the air-raid warning. This concession should considerably assist doctors and other persons who are called upon to drive at night while a warning is in force.

Psychiatrists for Service Casualties

Mr. RHYS DAVIES asked the Minister of Health whether he would cause inquiries to be made into the cases of members of H.M. Forces in emergency hospitals suffering from neurosis who were not being treated for their complaint by civilian psychiatrists on the spot, and who had to await the arrival of military medical attendants; and whether he would issue instructions that these men might be treated by either of the two branches of the medical profession as soon as their illness was observed.—Mr. M. MACDONALD replied: At all hospitals in the emergency hospital scheme, whether special neurosis centres or not, civilian psychiatrists are available for giving consultant advice as regards service and other patients. If treatment is required the case is transferred to one of the special centres, where civilian psychiatrists carry out the treatment.

Free Meals and Milk in Schools

Mr. GEORGE TOMLINSON asked the President of the Board of Education which of the authorities concerned had not yet adopted satisfactory schemes for the provision of free meals and milk in schools; and whether the urgency of dealing with this question was being represented to these authorities.—Mr. HERWALD RAMSBOTHAM replied: According to the latest information in the possession of the board the following eleven authorities have not yet adopted schemes for free meals or milk: Dorset, Isles of Scilly, Soke of Peterborough, Yorkshire (East Riding), Deal, Falmouth, Kidderminster, Maidstone, Margate, Morecambe, Peterborough. Provision has moreover been temporarily interrupted owing to war conditions in certain evacuation areas. The replies of local education authorities to circular 1520 are being examined as rapidly as possible, and where their proposals are not satisfactory authorities are being pressed to introduce the necessary improvements as a matter of urgency.

Nurseries in Industrial Areas

Miss E. RATHBONE asked the Minister of Health if he would state the number of day and residential nurseries that had been opened for the children of munition workers by his department in coöperation with local authorities; where the nurseries were situated; how many children were accommodated in each of them; and what was the approximate cost per child per annum falling upon the rates and taxes. Mr. MACDONALD replied: I have now approved the establishment by local authorities of 22 day nurseries for children whose mothers are munition workers. These nurseries, and the accommodation provided in each, are as follows:—

	Nurseries	Accommodation		Nurseries	Accommodation
Preston	3	135	Leeds	1	34
Birmingham	7	290	Tottenham	1	60
Leeds	1	30	Stockton-on-Tees	1	30
Bolton	1	50	Smethwick	1	30
St. Helens	1	30	Woolwich	2	75
Redditch (Worcs.)	1	45			
Coventry	2	110	Totals	22	939

The estimated cost of a day nursery is 3*s.* per attendance; of this 1*s.* is being met from taxes and usually the parents are asked to pay 1*s.*, the balance being met from the rates. The Exchequer bears the approved cost of adaptation and equipment of each nursery.

Assessment of Pensions

Sir SMEDLEY CROOKE asked the Minister of Pensions whether the assessments for specific injuries resulting from the present war had yet been restored from the peace-time basis on which they stood to the higher rates commensurate with war-time service which were still in issue to 1914-18 war pensioners in respect of the same specific injuries.—Sir W. WOMERSLEY replied: In many cases the assessments for specific injuries which have been applicable to service casualties since 1923 are already the same as those for similar injuries due to Great War service. At the same time certain improvements may be made in other rates of assessment as a result of the recommendations of the committee of experts who have had the whole matter under review and which are at present under consideration.

Medical History of Recruits

Mr. MALCOLM MACMILLAN asked the Minister if he would consult with the service departments in order to make it a rule that men being medically examined for service on calling-up should be asked to give full particulars of physical or mental disorders from which they had suffered, in view of the facts contained in cases recently laid before him in which men were passed fully fit for active service and later became casualties but were refused pension or their parents refused allowance, and also in view of the danger to the health of other men sharing confined service quarters with these men; and if he would review his decisions in respect of the cases mentioned and similar others.—Sir W. WOMERSLEY replied: I understand that the instructions to medical boards examining men before entry into the Forces provide for full inquiry of the men examined as to their medical history and particulars of illnesses from which they have suffered. It must rest with the men to give correct answers to these inquiries.

Health in Industry

Mr. DAVID ADAMS asked the Minister of Labour whether continuous inquiry was being made into the relation of hours of work and output or whether such inquiries would be made by the Industrial Health Research Board in order to ensure that the health of workers was never allowed to deteriorate and consequently to reduce their output.—Mr. ERNEST BEVIN

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replied: The Industrial Health Research Board is continuing its inquiries into this subject, and any further findings and recommendations of the board will receive the immediate attention of my department with a view to appropriate action.

Supply of Glycerin

In answer to a question to the Minister of Supply Mr. HAROLD MACMILLAN said that it was not possible to give a detailed list of the purposes for which glycerin is used; but technical and medicinal uses have been allotted a generous quota, the total amount allowed being approximately two-thirds of the pre-war consumption.

Atebrin in Ships' Medicine Chests

Sir ERNEST GRAHAM-LITTLE asked the Minister of Shipping whether he would consider substituting in ships' medicine chests Atebrin for quinine as this was now manufactured in this country, and was regarded by competent malariologists as being superior to quinine, both as a prophylactic and curative agent.—Mr. R. H. CROSS replied: I propose to issue to ships carrying doctors a memorandum which has been prepared by the Minister of Health in which advice is given regarding the use of atebrin, but I am informed that atebrin is a drug which should be administered only under medical supervision and sho ld not be included in the ordinary ship's medical chest because it is not suitable for use by unqualified persons.

Rehabilitation of Injured

Sir SMEDLEY CROOKE asked the Minister of Health whether he was in a position to make any statement on the findings of the interdepartmental committee set up to consider problems of rehabilitation of war-disabled persons.—Mr. MACDONALD replied: No interdepartmental committee has been set up to consider problems of rehabilitation of war-disabled persons, but my officers have been examining with those of other departments concerned certain aspects of these problems and I hope to receive their proposals shortly.

N.H.I. Contributions

Mr. RHYS DAVIES asked the Minister whether he was aware that some employers had recently decided not to stamp the health and pensions insurance cards of their non-manual employees whilst on holidays though contract of service continued and full wages were being paid for that period; that if this practice was extended it would mean a serious loss of income to the pension fund and approved societies, with consequent reduction in additional benefits; and would he inform all such employers that it was their duty to stamp those cards in respect of every week in respect of which wages were paid.—Mr. MACDONALD replied: Contributions are payable for holidays in respect of which wages are paid, but cannot be claimed for holidays where the employees receive payment which cannot be regarded as referable to the holiday period.

Diphtheria

Dr. A. V. HILL asked the Minister how many children annually contracted diphtheria and how many died of it; how many hospital beds, on the average, were occupied by diphtheria cases; what was the total annual cost to the country; and whether it was accepted by his department that the disease could be almost entirely abolished by preventive inoculation.—Mr. MACDONALD replied: The average annual number of cases of diphtheria at all ages notified in England and Wales is about 60,000, and the number of children under 15 included in this total may be estimated at 54,000. The average annual number of children under 15 who died from diphtheria is about 2700. The average number of hospital beds occupied at any one time by diphtheria cases may be roughly estimated at 5000, and the annual cost of the hospital treatment at one million pounds. I am advised that experience in Canada and the United States of America shows that the disease can be almost entirely eliminated if the immunisation of children can be secured and maintained on a sufficiently wide scale.

Dr. HILL: In view of the fact that children from one area were being freely moved to another, can the necessary reagents for preventive inoculation against diphtheria now be provided as a national charge instead of a charge on local authorities; and in view of widespread concern as to possible spread of infection in crowded shelters, will your department reconsider its present policy and take more active steps to immunise the child population against diphtheria.—Mr. MACDONALD: The policy of my department has been and is to encourage local authorities to provide facilities for immunisation against diphtheria, and to do their best to persuade parents to take advantage of these facilities for their children. The Chancellor of the Exchequer has agreed that the cost of the necessary material in present war conditions should be reimbursed to local authorities by the Exchequer. I am urging upon local authorities the special importance of these measures in the light of the considerations referred to in the questions, and informing them of this concession.

Medical Treatment for Service Dependants

Mr. GROVES asked the Minister whether he was aware that the York local medical war committee had notified doctors in its areas that the wives and families of men in the Forces were in some cases unable to afford medical attention and were, therefore, forced to apply to the relieving officer for treatment by the poor-law medical officers and proposed to compile a list of doctors who were willing to give free treatment to such persons; and whether he would now take the necessary action to provide a medical service for such dependants and so relieve them of having to apply to the relieving officer, as this, it was stressed by the York local medical war committee, was often felt to be a stigma.—Mr. MACDONALD replied: I am inquiring into the matter referred to in the first part of the question. The provision of free medical treatment for the dependants of members of the armed forces has been examined in consultation with the service departments, and I cannot add anything to the full statement made by the Secretary of State for Scotland on April 23, 1940.

Executive Officers at E.M.S. Hospitals

Mr. GROVES asked the Minister if he was aware that doctors attached to Emergency Medical Service hospitals complained that there were often four largely independent executive officers situated in different towns in respect of a single hospital and that this was occasioning delay and difficulty; and whether he would look into the matter with a view to promptitude in dealing with cases and general efficiency.—Mr. MACDONALD replied: I have seen correspondence in the medical press to the effect stated in the first part of the question. The officers referred to are not independent of one another, and their respective functions have been defined. There is no reason why delay or difficulty should occur if the instructions are properly observed, but the arrangements are kept constantly under review by my officers who take the necessary action if difficulty arises in any particular case.

Medical Services for Air-raid Shelters

Captain G. S. ELLISTON asked the Minister if he was aware that in districts within the Greater London area large night shelters were in use which, because they did not come within the scope of the circular 2190 to the metropolitan borough councils, lacked the medical and nursing services for which it provided; and what steps he was taking to remedy this.—Mr. MACDONALD replied: The arrangements in circular 2190 will be applicable where necessary in the areas referred to, and instructions have already been issued to this effect.

Ophthalmic Treatment of Injured

Mr. TOM SMITH asked the Minister the approximate percentage of air-raid casualties calling for some measure of treatment of the eye; and to what extent such casualties had been dealt with at first-aid casualty posts and hospitals.—Mr. MACDONALD replied: I regret that this information is not at present available. All hospitals receiving casualties are, however, being asked to make periodical returns showing the number of eye injuries dealt with. I do not think it necessary to obtain special returns from first-aid posts, as the more serious cases will pass through the hospitals.

The council of Epsom College will shortly award St. Anne's scholarships to girls attending Church of England schools. Candidates must be fully nine years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years. The value of each scholarship is dependent upon the means of the applicant and the locality and fees of the school selected. Educational grants will also be available from the Sherman Bigg fund for children of either sex. These grants are not restricted to orphans, or to members of any religious denomination, but candidates must be of public-school age and in need of such help. Forms of application for the scholarships and grants can be had from the secretary's office, Epsom College, Surrey.

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Obituary

THOMAS SINCLAIR KIRK

M.B. R.U.I.

Surgeon Kirk who died on Nov. 10, aged 71, was the last in Belfast to follow the old Irish custom of title. He came of an Armagh family of Keady and was the son of Henry Kirk, a linen merchant in Belfast. After his father's early death the family moved first to Stuttgart and later to New York, and Kirk was educated in these two cities and afterwards at the Belfast Academy and the Academical Institution. He had his professional training at Queen's College and the old hospitals of Belfast, and took the degrees in arts and medicine of the Royal University of Ireland in 1893. After graduation he spent a year in Egypt and there seems first to have heard of asepsis and seen the methods of its application; it was typical of him that he made a study of the technique of the Schimmelbusch apparatus, which he claimed afterwards to have introduced into Belfast. He accepted a junior house-appointment at the hospital in Frederick Street in 1894, and thus began his long work in the hospitals of his home town. Pathology was not prominent in Belfast then, means and accommodation were lacking, and one of his first acts on appointment was to buy a Cathcart microtome; he cut his own sections at the window of his bedroom. He began practice in Belfast as a surgeon in 1895, and soon established a connexion that grew with his reputation until it reached over all Ulster. He made his country journeys at first by rail and "outside car," and later he had one of the first motor cars in Ireland which he took to pieces himself and reassembled until, as he said, "he knew every pin of it and was prepared for any form of trouble." It was his surgery over again, direct, courageous, and based on personal knowledge; and he knew a lot about the human body. But he tended his patients with more than skill; he gave them assurance when it was required to continue courageously under handicap; and he won from them respect and lasting affection. He also took his share of insurance work and accident claims, and won a reputation in law for honest fair treatment.

Kirk first visited the Belfast Hospital for Children as a boy with his mother, who was a patron, and he eagerly sought and was always proud of his appointment as junior surgeon to it in 1895. He became senior surgeon in 1897 at the early age of 28, and when he retired in 1938 he was appointed consulting surgeon. He was a life governor for 45 years and chairman of the medical board until his retirement. He followed it from King Street to Queen Street and he watched the new building in the hospital centre grow from its foundations. He could not bear that children should be crippled or maimed if it were possible by thought and action to prevent it, and he became an expert in the treatment of fractures and diseases of bone in the young. For them he devised after twenty years of trial his oxygen treatment for the shock of burns which still awaits a more critical examination than he was able to give it. But by it he claimed to have greatly reduced the mortality-rate in his wards. He also served the Royal Victoria Hospital for 35 years and when he retired in 1935 was senior surgeon.

Kirk was not an easy teacher for the many, but for the few, and always there were some who followed him, he laid bare the foundations of diagnosis, the conceptions of tissue reaction, and the principles of treatment by which he himself worked. "I use the simple things," he said, "to get at the grounds of it all." He was never a passive receiver of others' views, and at times may have too summarily dismissed others' explanations of causation and the order of tissue change; but in matters of treatment he was cautious, and only expressed his opinion after fair trial. He never wavered in the belief that progress in medicine was the result of experience and that the experiment of the laboratory must meet its final test in the ward. His interests in his subject were too wide for the critical treatment that specialisation now demands; but he was a close observer and a good questioner of others. It is unfortunate that he did not express himself easily in writing so that most of his work remains unpublished. He held, for instance, that direct fractures and indirect fractures are different conditions, that the effects of shock are best countered by subcutaneous oxygen, that it is possible to use the maximum doses of vaccine at the same time in each of many different lymphatic areas, that many people have a permanent tissue infection, that urea is the natural antiseptic, and that the logical treatment of low forms of infection and chemical imbalance is by normal serum. He has bequeathed to his followers a rich store of ideas for inquiry.

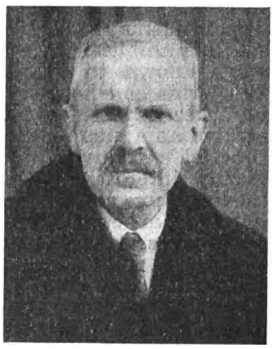
And, finally, he was deeply interested in his fellow-men and in the social schemes of the times, although after the death of his wife in 1925 he lived more and more with his pictures and his books, with some chosen friends, and with the idealism that was the essence of his being. Like all idealists, he was sometimes lonely, but he never lost his faith in the possibility of a better world and that a man is made or unmade by his moral standards.

He leaves a son, now serving with the R.A.M.C. in India, and a daughter who is the wife of Prof. Thomas Walmsley.

HERBERT BELL TAWSE

M.B. ABERD., F.R.C.S.

On Nov. 12 after a short illness Mr. H. Bell Tawse, hon. surgeon to the ear, throat and nose departments of the Nottingham General and Children's Hospitals, died at his home, Wymeswold Hall, in Leicestershire. He had lately returned from a well-earned holiday at his other home in Scotland, Culquoich House, Aberdeenshire, on the banks of the Don near where he spent a large part of his boyhood.



He was born in Aberdeen and educated at its university. After qualifying M.B. in 1900, he came south for further study in his specialty and held resident appointments at the Golden Square Hospital, the Central London Throat, Nose and Ear Hospital and in the aural and throat department of the London Hospital. But it was in Nottingham he settled, and in that city and county he soon became a friend as well as a trusted consultant. He was an ear, nose and throat surgeon of outstanding ability, and Dr. T. B. Gilbart-Smith, who worked with him as anæsthetist for nearly 20 years, testifies to his skill and his kindness to patients. He continues: Tawse's manner was sometimes rough, but when you got to know him well you realised it was only a cloak beneath which his true nature was anything but rough. His sense of humour and repartee was superb, but it was not always understood, and I remember when during an operation it had been particularly directed against me, the doctor present afterwards said to the nurse, "I always thought Tawse and his anæsthetist were great friends"! And so we were and remained to the end. He worked hard to perfect his technique in his specialty, and I am sure no man could remove tonsils by dissection better or quicker than he. Another colleague recalls how he removed a ball-bearing from the bronchus of a small child. Repeated attempts by bronchoscopy having failed. Tawse borrowed an electromagnet from the neighbouring Eye Infirmary and by this means the foreign body was successfully captured.

Tawse was appointed assistant surgeon to the Nottingham General Hospital in 1914, and when the new ear, nose and throat department was opened in 1927 he and his colleague, the late Mr. A. R. Tweedie, were appointed surgeons in charge and entrusted with its organisation. He was also consulting aural surgeon to

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the Nottingham county council, and was a member of the committee appointed by the Board of Education to inquire into the prevention of adenoids and enlarged tonsils. In 1928 he was appointed president of the laryngology section of the Royal Society of Medicine, and in 1939 the section of otolaryngology of the B.M.A. made a happy choice when they elected him as president for the meeting which was to be held at his second home, Aberdeen. In committee Tawse was a wise counsellor, and if a letter or resolution needed careful wording it would be left to him to draft.

As a trout fisherman on his own river he had few rivals. Often a guest would return anxious to exhibit his catch, only to find that his modest host had beaten him. Few amateurs had his knowledge of trees and flowers, and he added many varieties of coniferous trees to the splendid specimens growing round Culquoich. His wife died nearly two years ago, and he leaves a daughter and a son who is now resident surgical officer at the Royal Masonic Hospital, London.

DAVID WALKER HEWITT

C.B., C.M.G., M.B. R.U.I., F.R.C.S.
SURGEON VICE-ADMIRAL, R.N. RETD.

Surgeon Vice-Admiral D. W. Hewitt was born in 1870, the son of John Hewitt of Kingstown, co. Dublin. He was educated at the Royal School, Dungannon, at Galway University College, and at St. Bartholomew's Hospital. He qualified in 1895 and entered the Royal Navy two years later. In 1904 he was commended and in 1911 specially promoted to the rank of fleet surgeon for conspicuous professional merit. Shortly after he was appointed assistant to the medical director-general. After the last war as senior medical officer of the North Russian expeditionary force he was in charge of the medical arrangements for the Navy and the Army and his services were recognised with the C.B. He served once more at sea as principal medical officer of the new hospital ship *Panama* and in 1926 took up his last appointment at the Royal Naval Hospital, Haslar. It was his ambition to make his hospital efficient and its work known to officers outside the medical branch. With this end he maintained close contacts with heads of other departments of the service in the port and started an annual garden-party to which doctors in civil practice were invited to meet the hospital staff. He was keenly interested in improving the amenities of the medical mess and was largely responsible for building its hard tennis-courts. He was also the originator of the successful annual reunion dinners for medical officers serving in the ships and establishments of the port. An officer who served under Hewitt writes: He never spared himself and always gave of his best and he would accept no less from his officers. He was an expert administrator, but his heart was always in surgery—he had taken his F.R.C.S. twenty years after qualification—and he often said how hard he felt it not to be able to take part in the activities of the operating theatre. He never lost interest in the clinical side of the hospital and was always ready with words of advice and encouragement to his medical officers.

OWEN FOULKES EVANS

M.D. EDIN.

Dr. Evans, who died at his home in Liverpool on Nov. 8, was one of the best-known practitioners in the Sefton Park district. Born in Anglesey 79 years ago of yeoman stock, he was educated at the Holt Academy, near Wrexham, and later returned home to take up farming. After a few years he decided to study medicine and went to the University of Edinburgh, where he qualified in 1890, obtaining his M.D. four years later. The whole of his fifty years of practice was spent in Liverpool, where he was well known and respected, particularly by the Welsh community. He leaves a widow.

Dr. Evans was an ideal family physician. Apart from the high level of his medical work and the scrupulous care and devotion with which he conducted it, he had a most charming personality. He was never in a hurry, never late for an appointment, and he made his patients feel that he had plenty of time to deal with their particular cases. The soothing effect of his visits had a potent therapeutic value.

Public Health

Health in Iceland

THE annual reports of Dr. Vilmundur Jónsson, the director of public health in Iceland, are always of interest in showing the violent epidemic swings that occur in his small and somewhat isolated community. The normal bill of health of the island is also of more than passing interest at the moment from the point of view of the British occupation and it is comforting to note that the last report, that for 1938, presents in general a cheerful picture. The crude death-rate in that year was only 10·2 per 1000 inhabitants and the infant-mortality rate as little as 29 per 1000 livebirths, both remarkably low figures and evidence of healthy conditions of life. Still lower figures will be achieved if the relatively high rate from tuberculosis responds, as it appears to be doing, to the active measures being taken against it. The other notably high mortality-rate—that from accidents—is a product of the chief occupation of the people, the fisheries, and is clearly difficult to attack. In previous days diphtheria took a heavy toll of the children but is now, Jónsson reports, prevented from becoming widely epidemic by inoculation. There were, however, 136 cases in the two years 1935–36 in a total population of nearly 120,000 and universal inoculation of children would clearly be worth while, as well as a valuable illustration of its benefits. The changeable climate is the cause of frequent cold epidemics, and pneumonia is amongst the more prominent causes of death. Rheumatic fever is rare, diabetes is hardly ever seen, and deficiency diseases are now infrequent. Gonorrhœa is endemic in the towns, and may be increasing, though syphilis is not often seen. Prostitution and drug-taking are both hardly known in the island, but Jónsson views with some concern an increasing consumption of alcohol. In a short historical review of the island's health and health services he shows how far it has moved on the road to its present good bill—from an infant-mortality rate of some 300 per 1000, a wide prevalence of leprosy, hydatids and tetanus, and years in which epidemics of the common infectious diseases killed 20–30% of the population. In 1882 some 1700 people, he says, died of measles, or nearly a quarter of the population, whereas in 1936 there were over 8000 cases, partly in rural districts where there had been no measles for many years, but only 50 deaths.

Gibraltar

The report of Major R. A. Mansell on the health of *Gibraltar* for 1939 is the last of its series, for the non-combatant population has been largely evacuated, and Major Mansell tells us that his period of office is ended. The report is much shorter than usual, but as Major Mansell writes "strongly—even bitterly" about the housing conditions and the delay in improving them, it is not likely to pass unnoticed. The Hone report on housing was published in March, 1937, and at the end of October of that year its recommendations were accepted by the British Government. The printed draft of a housing ordinance was approved by the city council in June, 1938, and submitted to the Government. There it apparently remained dead until shortly after the outbreak of war when the Government declared that the housing scheme must be held in abeyance till the end of the war. That the bitterness of Major Mansell's words is fully justified is apparent from the following passage:

> It is stated freely, and there is no reason why this should not be repeated, that Gibraltan labour is not of the quality, either in foot-pounds of mechanical toil or in actual technical skill, that can be found in other parts of Europe or the world. I always ask such critics what they would produce themselves did they have to live with a wife and three grown and growing children in one room—and nothing more—some fourteen feet square on a wage of less than thirty and a rent of five shillings a week, with no provision for sickness, unemployment or old age and a cost of living not greatly less than that obtaining in England.

In view of this it is not surprising that infantile mortality is high. Of 378 infants born alive 30 died, giving a mortality-rate of 79, the highest for ten years. Of these deaths 12 were due to gastro-enteritis and 5 to other

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postnatal causes. The rate has been mounting steadily for the past four years in parallel with the grossly overcrowded condition of the city. What the fate of Gibraltar will be after the war cannot be foretold, but it is certain that the city as Major Mansell knew it will cease to exist, so in every sense his report for 1939 is the last.

Medical News

University of Cambridge

On Nov. 22 the degrees of M.B., B.Chir. were conferred by proxy on D. H. Manson-Bahr.

University of London

At recent examinations the following were successful :—

THIRD EXAMINATION FOR M.B., B.S.

W. H. H. Merivale (*g*), St. Thos. Ruth E. M. Bowden (*e*), Roy. Free; Frances V. Gardner (*c, d, e*), Roy. Free; Florence R. Pillman (*d*), Roy. Free; N. S. Slater (*c*), Univ. Coll.; A. G. Spencer (*f*), Univ. Coll.; R. E. O. Williams, (*a, c, d*), Univ. Coll. (all with honours); Laura M. Bates, Roy. Free; A. D. Bell, Guy's; P. W. Clarkson, Guy's; Daniel Couesland, Univ. Coll.; O. P. Dinnick, Middlesex; D. M. Douglas, Guy's; M. M. Ernst, Univ. Coll.; K. W. G. G. Heathfield, St. Bart's; Margaret J. Honeywill, Univ. Coll.; E. G. Hosking, Univ. Coll., Cardiff; Geoffrey Levy, Westminster; J. C. H. Maidment, London; Simon Meleck, London; N. P. Orchard, St. Bart's.; M. F. Pilcher, Univ. Coll.; H. I. H. Porcher, Univ. Coll.; A. G. Stephenson, Univ. Coll.; L. H. Turner, Middlesex; C. K. Warrick, St. Bart's; John Wills, Guy's; D. A. Barley, King's Coll.; G. A. Beck, St. Bart's; J. C. Bryce, Univ. Coll.; F. B. Cockett, St. Thos.; Leonora A. Crawford, Roy. Free; Muriel Crouch, Roy. Free; T. H. Cullen, Middlesex; William Darby, St. Mary's; Jean L. Edwards, Leeds; Mary E. Elloart, King's Coll.; G. R. Evans, St. Bart's; James Freeman, Middlesex; R. C. Fuller, St. Mary's; O. C. Fung, Guy's; Margaret E. Harker, Roy. Free; C. A. Holman, St. Geo.; R. E. B. Hudson, St. Mary's; J. I. P. James, Univ. Coll.; A. O. John, St. Bart's; Elspeth M. Kaye, Roy. Free; Joyce A. Keeping, King's Coll.; Gwendoline M. E. Keevil, Roy. Free; H. A. Kreiser, Guy's; D. R. Livingston, St. Mary's; Kathleen B. McClintock, Roy. Free; Michael McFarlane, St. Bart's; Christina M. McGillivray, Roy. Free; B. U. Meyer, Univ. Coll.; Margaret Middleton, Roy. Free; Phyllis Morley, Manc.; A. O. A. Ohannessian, St. Bart's; Ruth P. Peterson, Roy. Free; Mary L. Rae, Roy. Free; K. O. Rawlings, Guy's; T. H. E. Richards, St. Bart's; E. A. Ritchie, Charing Cross; Ernst Rosenbaum, Middlesex; B. C. Rowlands, St. Mary's; C. A. Royde, Westminster; Mary M. E. Rutter, Roy. Free; R. A. Sandison, King's Coll.; A. C. J. Saudek, St. Bart's; D. W. Shields, King's Coll.; Daisy M. Smith, Roy. Free; Margaret C. Smith, Roy. Free; J. H. Smitham, Westminster; G. S. C. Sowry, St. Mary's; Irene J. Stark, Roy. Free; Kathleen Staynes, Roy. Free; Matthew Steel, Univ. Coll.; D. V. Stott, King's Coll.; P. V. Suckling, Univ. Coll.; P. H. Sutton, Westminster; Margaret L. Taylor, Roy. Free; Beatrice M. Thompson, Roy. Free; H. A. Warbrick-Smith, Middlesex; J. A. E. Watts, Guy's; Robert Wigglesworth, St. Bart's; Mary U. Wilkin, Roy. Free; D. W. Williams, Westminster; Simon Witt, Univ. Coll.; B. W. Wood, King's Coll.

(*a*) distinguished in pathology.
(*c*) distinguished in hygiene and forensic medicine.
(*d*) distinguished in medicine.
(*e*) distinguished in applied pharmacology and therapeutics.
(*f*) distinguished in surgery.
(*g*) distinguished in obstetrics and gynæcology.

The Committee to Defend America by Aiding the Allies have sent out a circular letter to 140,000 doctors and to 66,000 dentists urging that the best way of keeping the war out of America is to give all possible aid to Britain. They ask for active participation in the work and contributions for help in arousing America "from its rôle of sleeping prospective victim." They point out that "with nation after nation it has been too little and too late." The response from the medical profession has been so good that members of the Bar Association and other groups are shortly to be circularised. The letter was signed by the subcommittee for medicine, consisting of Dr. R. I. Lee, a trustee of the A.M.A., Dr. R. L. Wilbur, president of Stanford University, and professors at the medical schools of Johns Hopkins, Tulane, Chicago and California.

A meeting of the Shaftesbury Military Hospital Medical Society will be held on Tuesday, Dec. 3, at 3 P.M., at the hospital, when Major S. G. Chesney and Major F. Stuart Harris will open a discussion on air-borne infectious diseases and their prevention.

Messrs. C. F. THACKRAY (Leeds) inform us that they are introducing a new digest-modified staphylococcus toxoid from the Lederle Laboratories, New York, whose sole distributors in England they are. The toxoid replaces the staphylococcus toxoid dilutions 1 and 2 as listed in their catalogue. Reactions are less frequent and severe with the new product because the allergenic quality is modified and thus the safe limit of dosage is extended.

Royal Appointments

The following officers have been appointed hon. physicians and surgeons to the King:—

Royal Australian Navy.—Surgeon Captain W. J. Carr, Surgeon Captain Leonard Darby.

Australian Army.—Colonel D. M. McWhae, Colonel R. W. Whiston-Walsh.

Australian Air Force.—Group Captain E. A. Daley, Air Commodore T. E. V. Hurley.

New Zealand Army.—Colonel F. T. Bowerbank, Colonel Kenneth McCormick.

Army Casualties

The following casualties in the R.A.M.C. are announced :—

Wounded and prisoner of war.—Lieutenant G. H. Darke, M.B. Lond.

Prisoner of war.—Major C. R. Alderson, M.R.C.S.; Captain Norman Altham, M.B. Manc.; Captain Hugh Dickie, M.B. Glasg.; Major W. N. S. Donaldson, M.B. Glasg.; Lieutenant M. A. Egan, M.B. N.U.I.; Lieutenant T. K. Elliott, M.B. Lond.; Lieutenant E. MacR. Fraser, M.B. Edin., Major G. D. Hadley, M.R.C.P.; A./Major C. W. Horncastle, M.B. Lond.; Lieutenant C. W. Iliffe, L.R.C.P.E.; Lieutenant J. A. James, M.R.C.S.; Captain William Lumsden, M.B. Aberd.; Lieutenant E. W. Macmillan, M.B. Edin.; Major F. J. O'Meara, F.R.C.P.I.; W.S./Captain Robert Robertson, M.B. St. And.; Lieutenant A. F. Stallard, M.B. Camb.; A./Major G. C. Steel, M.R.C.S.; and A./Major A. W. Woolley, M.B. Brist.

The Paddington Medical Society will hold a meeting on Tuesday, Dec. 3, at 2.30 P.M., at St. Mary's Hospital, Paddington, when there will be a discussion on such current medical problems as shelters, bombed surgeries, surgery hours, private and panel practice, ambulance services and evacuation of patients.

On Saturday, Dec. 7, at 11.45 A.M., the Biochemical Society will meet at the department of physiology of the school of medicine, Leeds.

Lieut.-Colonel H. J. Bensted will deliver the Harben lectures to the Royal Institute of Public Health and Hygiene (28, Portland Place, London, W.1) on Dec. 9, 10 and 11 at 11.30 A.M. He will discuss modern practice in war-time immunisation of soldiers and civilians. The lectures are open to all without fee.

Dr. S. T. Crowther has been appointed temporary assistant lecturer in the department of pathology and bacteriology at the Welsh National School of Medicine, Cardiff.

The council of the Harveian Society of London have announced that the subject of the next Buckston Browne prize essay will be the evaluation of methods of physical training and the best scheme for general application. The essay must be sent to the hon. treasurer of the society, 14, Devonshire Street, W.1, by Oct. 1, 1942. The prize of a medal and £100 is open to all registered practitioners in the British commonwealth of nations.

A general meeting of fellows of the Royal Society of Medicine will be held at 1, Wimpole Street, London, W.1, on Tuesday, Dec. 3, at 3.30 P.M. On Dec. 4, at 2.30 P.M., the section of the history of medicine will meet to hear a paper on the history of endocrinology by Dr. A. P. Cawadias and a medico-psychological revision of the story of Jehanne la Pucelle from Dr. H. P. Bayon. On the same day and at the same time the section of surgery will discuss chest injuries, and Mr. C. Price Thomas, Dr. J. E. Livingstone and Mr. Norman Barrett will be the openers. On Dec. 6, at 10.30 A.M., Mr. T. B. Layton will open a discussion at the section of otology on causes of failure in the treatment of acute otitis media, and at 2,15 P.M. on the same day Mr. J. C. Hogg at the section of laryngology will speak on aspects of sinusitis.

The house of the society will for the present open at 9.30 A.M. and close one hour before blackout. It will be closed on Dec. 25 and 26.

The council of the Pharmaceutical Society has offered the Government the use of its new house in Brunswick Square if facilities are given to finish its construction. The building has a steel frame and the floors are of reinforced concrete; it has been designed to provide a basement, ground floor and five upper stories. The main front block and the west and centre wings are already at fourth-floor level; the east block is only at basement level. The building is prepared for central heating on the panel system and the heating panels are in place; the plumbing work, including lavatory accommodation, is also in position. The building will have a floor area of over 140,000 sq. ft.

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Notes, Comments and Abstracts

THE DOCTOR IN THE FACTORY

THE task of looking after factory workers is to some extent what the doctor makes it; he can interpret it simply as the first-aid treatment of injuries, or he can see it much more widely as an opportunity to teach hygiene and public health, and to make a study of the causes of industrial sickness. The Factory Department of the Ministry of Labour takes the widest possible view of his duties. A new memorandum on medical supervision in factories [1] emphasises his status in the works; he should be in direct personal contact with the management, or better still an integral part of the management on the personal side without being concerned with wages, hours of work or conduct of the factory on the production side except in so far as the two last affect the health of the worker. The part-time services of a doctor may meet the needs of a small factory, but in a large firm only a man who devotes his whole time to it can supervise the health of the workers properly. Among other things he will organise the first-aid treatment of injury and sickness, without, of course, undertaking any treatment of the patient in his home. Continued treatment at the works will only be given with the consent of the worker's panel doctor. The works doctor will also examine and advise any worker who consults him or is referred to him by the labour manager, and vet those about to begin work on processes involving some special health hazard. Under the Factories Act young people under the age of 16 entering industry must be seen by the examining surgeon of the district, and the Minister of Labour may authorise the works doctor to undertake this task. Probably medical examination of entrants of any age would be an advantage, because the doctor could say whether a man was suitable for his proposed job. Examination at regular stated intervals is required for those engaged in processes specified under the act, and probably it would be useful to arrange such periodical examinations of workers in jobs where a large labour turnover or a fall in production indicates that conditions of work might be improved.

The works doctor will also be able to see that the man returning to work after an illness is fit, or (by co-operating with the panel doctor and the works manager) to arrange for him to return to some suitable form of work temporarily, until he is really fit for his job again. After a man has had an accident the doctor may be able to suggest graduated work for him in the factory as a part of rehabilitation and to aid functional recovery. The doctor must also advise the management on general hygiene inside the factory and coöperate with the welfare authorities outside in everything affecting the health of the workers, maintaining an effective liaison with panel doctors, hospital services and local authorities. This will enable him to follow the patient's progress during illness, and to inform the panel doctor or the hospital almoner when the firm is willing to give help with specialised treatment or to send the man to a convalescent home or a physical treatment centre.

He can teach the workers themselves much about hygiene both during personal interviews when they come up for examination or treatment, and by means of short talks given from time to time to groups of workers. He will also train those who are to share in the first-aid service of the factory, and in this he will be greatly helped by the services of a state-registered nurse. Record-keeping, with which the nurse can also give assistance, is an important part of the doctor's work. It keeps the management up to date on the general health of the workers and may bring to light unexpected facts about sickness incidence in special groups or among those exposed to risks peculiar to processes carried on in the factory. Uniform record-keeping would have the advantage that findings in different industries could be compared; a standard record-card is printed as an appendix to the memorandum. Finally the works doctor shares in the A.R.P. services of the factory and in the training of the A.R.P. personnel. The programme laid down for him is thus not only wide but stimulating as it gives opportunities for clinical work, organisation, teaching, research, and winning the George medal.

1. Form 327. H.M. Stationery Office. 1940. 2d.

FROST IN YOUR RADIATOR.—Anyone who lets his car freeze this winter is going to find it difficult to obtain replacements, and the Medical Insurance Agency is sending its policy-holders some advice as to how to avoid this catastrophe. Car-owners should study the recommendations about freezing given in their policies. If they find it impracticable to drain the water-cooling system, they should employ a trustworthy anti-freeze mixture. Some of the products sold as such are not reliable, and advice should be sought on this point—the agency (address B.M.A. House, Tavistock Square, W.C.1) will give it if asked. Anti-freeze mixtures may be lost by evaporation and leakage, so that radiators should not be filled to the brim, and regular additions of mixture are necessary. If reliance is placed on draining the system, all outlets must be opened; in some makes of car there are multiple outlets. Care must be taken to see that the outlets are free and not choked with sludge. Rugs, radiator-covers and even heaters may not give effective protection in really severe weather.

FACTORY CANTEENS.—Under a new order any factory employing more than 250 persons engaged on work for the Crown may be required to provide hot meals in or quite near the factory.

A royal medal has been awarded by the Royal Society to Mr. F. H. A. Marshall, F.R.S., reader in agricultural physiology in the University of Cambridge, for his contributions to the physiology of animal reproduction.

Appointments

ARMITAGE, GEORGE, M.D., M.Ch. Leeds, F.R.C.S.: hon. surgeon to the Leeds General Infirmary.

BUCKLEY, BRENDAN, M.B. N.U.I.,: temp. M.O.H. for Jarrow.

FLEMING, H. S., M.B. N.Z.: examining surgeon under the Factories Act, 1937, for Horley, Surrey.

GREEVES, PERLA, M.B. Belf.: asst. M.O. at the new maternity hospital at South Shields.

HEADLEY-BLYTHE, J. B., L.M.S.S.A.: asst. M.O. at the Royal Institution, Colchester.

MACFARLANE, R. G., M.D. Lond.: asst. clinical pathologist at the Radcliffe Infirmary, Oxford.

PRICE, A. K., M.B. Lond., F.R.C.S.: temp. R.S. at Selly Oak Hospital, Birmingham.

SEWELL, ADA M., M.B. Glasg., L.M., D.R.C.O.G.: part-time M.O. for Dartford.

Births, Marriages and Deaths

BIRTHS

DENNISON.—On Nov. 20, at Guildford, the wife of Lieutenant E. J. Dennison, R.A.M.C., of East Grinstead—a son.

HEARN.—On Nov. 16, at Bedford, the wife of Lieutenant G. W. Hearn, R.A.M.C.—a son.

JEFFERISS.—On Nov. 18, at Winchester, the wife of Captain Derek Jefferiss, R.A.M.C.— a son.

SUTTON.—On Nov. 20, at Fulmer Chase, Bucks, the wife of Surgeon Lieut.-Commander R. J. C. Sutton, R.N.V.R.—a daughter.

MARRIAGES

CUSSEN—MCELLIGOTT.—At Chatham, John Cussen, M.B., Surgeon Commander, R.N., to Dorothy McElligott.

WATSON—UNDERHILL.—On Nov. 18, at Hambleden, Henley-on-Thames, John Stewart Ferra Watson, M.R.C.S., Major R.A.M.C., to Rosemary Underhill.

DEATHS

BEATH.—On Nov. 21, at Belfast, Robert Maitland Beath, M.B. Belf. and Lond., F.F.R.

BRETT.—On Nov. 17, at Cranbrook, Kent, Harry Clarence Marshall Brett, M.R.C.S., aged 72.

CAMPBELL.—On Nov. 16, at Lamlash, Arran, Dugald Campbell, M.B. Glasg., aged 82 years.

NASMYTH.—On Nov. 19, at Brockenhurst, Hants, William Ramsay Nasmyth, M.D. Edin., F.R.C.S.E., D.P.H.

ROBERTSON.—On Nov. 14, at Dumfries, William Stewart Irvine Robertson, M.B. Edin., D.P.H.

SINCLAIR.—On Nov. 25, in Belfast, Thomas Sinclair, C.B., M.D. R.U.I., F.R.C.S., M.P., aged 81.

STEVENS.—On Nov. 21, in London, Richard Henry Easington Stevens, M.R.C.S.

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ORIGINAL ARTICLES

CHEMOTHERAPY OF ABDOMINAL ACTINOMYCOSIS

By G. C. DORLING, F.R.C.S.
SENIOR RESIDENT SURGEON AND DEPUTY MEDICAL SUPERINTENDENT OF LEWISHAM HOSPITAL; AND

N. L. ECKHOFF, M.S. Lond., F.R.C.S.
ASSISTANT SURGEON TO GUY'S HOSPITAL; SENIOR SURGEON TO ST. JOHN'S HOSPITAL, LEWISHAM; CONSULTING SURGEON, L.C.C.

THE usual course of abdominal actinomycosis is well known. The patient is admitted to hospital with acute appendicitis, often with peritonitis, and an operation is performed for removal of the appendix and drainage. Discharge continues from the incision for weeks and months, and not infrequently secondary operations have to be performed for collections of pus in the pelvis, subphrenic spaces or other parts of the abdominal cavity. The disease spreads along connective-tissue planes so that the soft tissues of the abdominal wall may be progressively ulcerated, leaving the ilium bare in the wound, or by adhesion to other viscera, such as the bladder, causing a fistula. A typical actinomycotic abscess often develops in the liver, and when this happens death is almost certain. At some time during this period actinomycosis may be recognised from an examination of the discharge.

Many methods of treatment are tried. Cope (1938) mentions potassium iodide (which has a definite effect in cattle), iodine in milk, Collosol Iodine and intravenous sodium iodide, Iodipin, copper sulphate, Yatren, formalin, Salvarsan, X rays, radium, vaccines and extract of lymph-glands, in addition to constitutional and surgical treatment. Thymol has been recommended by Myers (1937), and by Bancroft and Stanley Brown (1938). It is clear that no specific has been discovered, and this has led to a further search for a drug that would be of value. There have been a certain number of reported cases treated by chemotherapy.

The first reference to chemotherapy in actinomycosis was made by the late Dr. E. P. Poulton at a meeting of the Royal Society of Medicine in October, 1937. He pointed out that there were cases of hæmolytic streptococcal infection associated with other diseases—an unexpected occurrence—and discussed a patient who had abdominal actinomycosis and ran a continuous fever for a considerable period. Deep X rays were tolerated badly and only small amounts of iodine could be taken. The antistreptolysin titre was high. On sulphanilamide the temperature came down in five days. The patient put on weight, was discharged to Carshalton and had had no temperature since.

In 1939 Miller and Fell reported a case of abdominal actinomycosis in a boy of eleven admitted to hospital in October, 1937, with a mass in the lower abdomen which later discharged from the umbilicus and from sinuses in both iliac fossæ. Actinomycosis was found in the granules. All the well-known methods of treatment were used, including thymol and potassium iodide and X-ray therapy, but by January, 1938, his temperature was ranging between 101° and 102° F., he had lost a lot of weight, the abscess in the lower part of the abdomen had become larger and extended towards the right, where a new sinus had opened, and a fatal termination seemed almost certain. Sulphanilamide gr. 10 t.d.s. was begun on Jan. 18, in addition to the other drugs, and within a week improvement was observed. The mass in the abdomen gradually became smaller and softer and the amount of discharge diminished. The boy's appetite returned, he began to gain weight and his general appearance rapidly improved. When he was discharged to outpatients on March 22 he had gained 10 lb. By Oct. 1 all wounds had entirely healed, and on Nov. 16, 1938, he was in robust health.

Oliver Walker (1938) of Liverpool reported a case of actinomycosis following the removal of a gangrenous appendix, six months after which there was a mass filling the right iliac fossa and a persistent sinus discharging profusely, with sulphur granules showing typical filaments of actinomycosis microscopically. No improvement followed potassium iodide or Lugol's iodine. From March 4 to 10, 1938, inclusive, 1 g. of sulphanilamide was given thrice daily by mouth and this treatment was rapidly followed by lessening of the purulent discharge and disappearance of the sulphur granules. The course was repeated on March 20 for a further five days. On the 29th there had been no discharge for four days and the sinus had closed. On May 12 the abdominal wound was firmly healed, the mass in the right iliac fossa had entirely disappeared, the abdominal discomfort had vanished and the general health was greatly improved.

Sudler and Johnson (1939) of Kansas reported in August, 1939, two cases of typical (microscopically proved) actinomycosis of the cervico-facial type both dramatically cured after sulphanilamide. Jorge, Browne and Mealla (1938) of Buenos Aires reported two further cases of cervico-facial actinomycosis which responded well to sulphanilamide.

Ogilvie (1940) has recently reported a case of abdominal actinomycosis which has apparently recovered after treatment with sulphapyridine. He suggests that the sulphapyridine by eliminating the secondary streptococcus allowed the patient to effect her own cure of the actinomycotic infection.

CASE-RECORDS

The first of our cases was treated early in 1939, not without some scepticism on the part of one of us (N. L. E.) but in view of the striking benefit in this case chemotherapy has since been instituted whenever actinomycosis has been suspected.

CASE 1.—Male, aged 8. Admitted to Lewisham Hospital on Jan. 21, 1939, as a case of acute appendicitis with a 3-day history of pain, diarrhœa and vomiting, and a temperature of 103° F. The abdomen was much distended, resistant to the touch and slightly tender on the left in the region of the spleen. A boggy swelling could be felt per rectum. Peritonitis probably appendicular in origin was diagnosed, but the child was considered too ill to stand operation. Since pneumococcal or streptococcal peritonitis could not be excluded a course of M. & B. 693 was given, starting with one tablet 4-hourly for 6 days, followed by one tablet 8-hourly for 9 days. Total 31½ g. The temperature came down to 100° F. at first, but later rose again, and in the third week was in the neighbourhood of 102° F. The abdominal distension gradually lessened, and localised masses could be felt, particularly in the lower abdomen, and a rounded swelling was felt per rectum.

On Feb. 11 operation was performed for drainage of the collection in the pelvis and the right iliac fossa, but no attempt was made to remove the appendix. Discharge was free from both incisions, but later became less in amount and rather thicker. Actinomycosis suspected but culture grew *Bacillus coli* only. On March 10 the pus contained a gram-positive branching streptothrix, and on the 27th anaerobic cultures yielded a good growth of *Actinomycosis bovis* after 21 days. Aerobic cultures grew coliforms, non-hæmolytic streptococci and *Staphylococcus albus*. At this time the boy was given pot. iod. gr. 10, t.d.s. for two weeks and tinct. iodi ℥5 in milk, with no improvement. The temperature still rose to 101° or 102° F. each evening, and profuse discharge continued from the wound.

Beginning on April 10 two tablets of sulphanilamide were given 8-hourly for 6 days followed by one tablet 8-hourly for 10 days. Total 33 g. By the 15th there was great improvement. The discharge was much less, dressing being now necessary only once instead of six times a day. The mass in the abdomen appeared to get smaller and the boy began to gain weight. By the end of the second course of sulphanilamide the wound was dry, but the abdominal mass still persisted, though it was much smaller. A third course was therefore given three weeks later.

On July 12 the boy was referred to Lambeth Hospital for deep X rays, to consolidate the cure, since there was still a little induration above the inguinal ligament on each side and in the recto-vesical fossa. A total dose of 2000 r units was given in 24 days.

On Jan 5, 1940, he returned to Lewisham with a mild attack of abdominal pain, fever and a small lump in the right iliac fossa; the symptoms subsided with prontosil.

On Feb. 26 he returned to have his appendix removed. No adhesions were found in the abdomen though the appendix

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was scarred and bent sharply in the middle, showing that it had almost certainly been the original focus of disease. The peritoneal cavity appeared normal in every respect. Pathological report on appendix was chronic fibrosis; no actinomycosis discovered.

This boy was very ill, on the danger list for many weeks, and the disease was steadily progressing in spite of treatment when sulphanilamide was given. The improvement was immediate, and we feel certain his cure was due to chemotherapy. Because this was our first case X rays were given as well but not until he was almost well. The cure was confirmed at the subsequent operation.

CASE 2.—Male, aged 16. Admitted to Lewisham Hospital on Nov. 13, 1939, with a 3-day history of abdominal pain. He had a history of similar attacks at 3 or 4 monthly intervals for 2 years. A mass could be felt in the right side of the abdomen and conservative treatment was decided on. The temperature varied between 100° and 103° F., and since the mass appeared to be getting bigger, the abdomen was opened on Nov. 18. A mass of adhesions was found shutting off the general peritoneal cavity, and a large abscess cavity was opened, extending down into the pelvis and up into the left iliac fossa. A perforated appendix was removed, and a split rubber drain inserted. By the 24th actinomycosis was suspected owing to the persistence of a mass extending right across the lower abdomen, and well up into the left iliac fossa, continued induration in the rectum, persistent pyrexia and thin foul-smelling pus from the wound. A course of M. & B. 693 was therefore begun, 2 tablets being given thrice daily for 8 days; total 24 g. The temperature fell within 12 hours and remained below 99° F. for 5 days, but it rose to 100° F. for the next 2 days, and mounted again when the drug was stopped.

On the 28th the white-cell count was 21,000, polymorphs 88%. A film of the pus from the wound showed gram-positive filaments, anaerobic cultures yielded a moderate growth of *A. bovis*. Aerobic cultures grew *Strep. fæcalis*, *Staphylococcus* and *B. coli*. A blood-transfusion was given on Jan. 14. On Jan. 28 the urine was loaded with pus and contained *Strep. fæcalis*, implying rupture of the abscess into the bladder. The temperature fell rapidly after the rupture of the abscess but a further course of M. & B. 693 was begun on Feb. 5, two tablets being given 4-hourly for 3 days, with M. & B. soluble 3 c.cm. four times a day for 2 days. The temperature gradually subsided during the following eight weeks. By March 4 no streptothrix could be grown from the pus, and by the 26th the wound had almost healed and the boy's general condition had much improved. On April 10 there was still some pus and *Strep. fæcalis* in urine. At the end of May there was still some induration in the left iliac fossa, but he was fit for work. By the end of July he was quite well apart from an incisional hernia.

This was a typical case of severe abdominal actinomycosis with emaciation, masses in the lower abdomen, profuse discharge and a high swinging temperature. The nursing staff were convinced that he was going to die because of the rapid deterioration in his general condition. Within 12 hours of beginning sulphapyridine his temperature fell and he rapidly improved in every way. The only setback was due to a localised abscess which burst into the bladder. If the second course of the drug had been given sooner it is possible that this complication might have been avoided. In spite of it he made a complete recovery.

CASE 3.—Male, aged 18, admitted to hospital on Feb. 13, 1940, with abdominal pain which had lasted 2 days. Appendicitis diagnosed and at operation generalised peritonitis was found, a perforated retrocæcal appendix was removed and drainage instituted. Next day signs of peritonitis continued and M. & B. 693 was given, two tablets 4-hourly for 3 days, and one tablet 4-hourly for 2 days. Total 24 g. By the 18th the temperature had subsided but the general condition appeared to be worse and a large pelvic abscess was drained above the pubis. Feb. 24, pathological report on anaerobic culture of the pus: branching streptothrix resembling *A. bovis* and a heavy growth of fusiforms, coliforms, staphylococci and streptococci; aerobic culture, *B. coli*. On the 26th sulphanilamide was given, four tablets immediately, two tablets 4-hourly for 3 days and one tablet 4-hourly for 6 days. Total 38 g. The temperature fell rapidly to 98°–99° F. but began to rise again when the drug was discontinued, and he died 7 days later. Sulphur granules were found on March 3. At autopsy there was still evidence of general peritonitis.

This was a case of rapidly spreading peritonitis of appendicular origin. The patient showed some improvement after sulphanilamide, but not sufficient to prevent the development of a pelvic abscess and death from continued peritoneal infection. Pathological examination revealed a heavy growth of *A. bovis*.

CASE 4.—Male, aged 15, admitted to hospital on March 18, 1940, with a history of abdominal pain for 2 days, at first central, later going to the right iliac fossa. Vomited at the onset. Extreme tenderness was found in the right iliac fossa, with much surrounding rigidity. Operation was performed without delay, and a gangrenous perforated retrocæcal appendix was removed. One drain was passed into the pelvis and another behind the cæcum. On the 24th he had signs of pelvic abscess, which was drained suprapubically on April 3. Pathological report on pus: gram-positive branching streptothrix filaments and a few gram-negative bacilli. Aerobic culture after 14 days gave good growth of *B. coli*; moderate growth of slightly hæmolytic streptococcus; anaerobic culture after 14 days gave moderate growth of branching streptothrix resembling *A. bovis*. On April 7, fæcal fistula from gridiron incision. Signs of right subphrenic abscess developed on the 11th. The eleventh rib was resected and two large kidney-dishes of pus evacuated; tube inserted. On the 16th sulphanilamide was given, four tablets immediately, two tablets 4-hourly for 4 days, one tablet 4-hourly for 7 days; total 47 g. At the end of this course his general condition was improved, though he was still pyrexial. On April 29 the sinus was packed with 20% thymol in oil and thymol gr. 10 was given by mouth on alternate days.

On May 14 he was discharging pus from the umbilicus in addition to the grid incision, the suprapubic incision and the subphrenic incision. Second course of sulphanilamide given, three tablets immediately and two tablets 4-hourly for 7 days; total 43½ g. Temperature fell from 99°–100° F. to normal in 2 days. By July 7 he was getting up. Still discharging pus from umbilicus and rib sinus; suprapubic sinus healed; fæcal fistula from gridiron incision. Umbilical sinus closed on Aug. 4. Slight fistula from grid incision and slight discharge from rib resection incision. On Aug. 26 an operation for acute intestinal obstruction was necessary. Many adhesions found binding down small intestine; no abscess cavity. He made a good recovery and was discharged on Sept. 26.

Similar to case 3 but followed by recovery. He developed a pelvic abscess, a subphrenic abscess, an umbilical sinus and a fæcal fistula. Some improvement was noticed with the first course of sulphanilamide in the fifth week, but the effect of the second course in the ninth week was dramatic and sustained.

CASE 5.—Male, aged 32, admitted on Feb. 21, 1940, with history of 50 hours of abdominal pain. Appendicitis diagnosed, and perforated gangrenous appendix removed with drainage. The temperature in the first week fluctuated between 99° and 101° F. On the 28th a fæcal fistula developed. Temperature 99°–100° F. On March 5, thick yellow pus from wound; actinomycosis suspected. Pathological report: no definite sulphur granules; numerous gram-positive streptothrix filaments with occasional branching; anaerobic culture gave growth of streptococcus and gram-positive branching streptothrix resembling *A. bovis*; aerobic culture gave growth of coliform organisms and diphtheroids. Sulphanilamide given starting with four tablets, followed by two tablets 4-hourly for 4 days and one tablet 4-hourly for 2 days; total 32 g. The third, fourth and fifth weeks were apyrexial, and a second course was given on March 21 of two tablets 4-hourly for 4 days; total 24 g. By April 8 he had healed; no discharge.

In this case the diagnosis was made early and chemotherapy started on the thirteenth day. He became apyrexial at once, the discharge rapidly lessened, and he left hospital only 5 weeks after admission and has remained well since.

DISCUSSION

In our cases sulphanilamide and sulphapyridine have both been used. Both appear to be effective in treating this condition, but further evidence is necessary before deciding if both are equally effective. Many concomitant organisms were found including coliforms, hæmolytic and non-hæmolytic streptococci, fusiforms and

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staphylococci. Some of these are known to be sensitive to the drugs used and it is not clear whether the beneficial results were due to this or to an action on the *Streptothrix actinomyces* itself. Early treatment, the value of which is illustrated by case 5, can only be achieved by suspecting actinomycosis at once in any patient with a sinus persisting after an appendix operation, and by examining the pus macroscopically, microscopically and culturally. Anaerobic cultures may have to be continued for 14–21 days before the organism is found, during which time the drug may well be given.

SUMMARY

Five cases of abdominal actinomycosis treated with sulphanilamide, sulphapyridine or both are described. Although all were severe infections 4 recovered completely; 1 died.

In one case, where deep X rays had also been used, a later operation showed that all evidence of disease had disappeared.

Chemotherapy should be tried early in all cases of suspected abdominal actinomycosis. Two or three courses of sulphapyridine, each lasting a week and with a week between, are usually needed.

We are indebted to Dr. Allen Daley, medical officer of health for London, and to the medical superintendent of Lewisham Hospital for permission to record these cases.

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ORAL ANTERIOR PITUITARY EXTRACT (COLLIP) IN DIABETES

By R. D. Lawrence, M.D. Aberd., F.R.C.P.

PHYSICIAN IN CHARGE OF THE DIABETIC DEPARTMENT, KING'S COLLEGE HOSPITAL, LONDON; AND

F. G. Young, D.Sc., Ph.D. Lond.

OF THE NATIONAL INSTITUTE FOR MEDICAL RESEARCH

Collip (1940a and b) claims to have observed an important "anti-diabetogenic" effect produced by a primary alcoholic extract of anterior pituitary tissue administered by mouth. "Evidence that the extract has a profound effect upon carbohydrate metabolism" has been obtained, according to the summary in Collip's first paper (1940a). As Collip's claim is definite and very important, we have attempted to confirm his results as closely as possible on diabetic humans and dogs, with negative results.

EXPERIMENTAL

Preparation of anterior pituitary extracts.—Collip's (1939) description of the preparation of the "primary neutral alcoholic extract" states that three extractions are made of the ground anterior lobes, with four volumes of 95% ethyl, 5% methyl, absolute alcohol, and the combined extracts are concentrated at low temperature with the addition of water, until all the alcohol has been removed. The resulting sludge is chilled and filtered through paper, the fat thus being separated from the aqueous filtrate. Using fresh frozen ox pituitary glands (cf. Young 1937) we have found it possible to obtain a clear-cut separation of the fat by filtration at this stage, because in our experience the concentration of the alcoholic extract produces a stable emulsion of the fat in the aqueous phase. In the experiments with human beings described below we have used three different preparations. In the preparation of extract 1 the fat was removed by shaking out with ether; with extract 2 the fat was filtered off through kieselguhr, a tolerably clean separation being obtained, while extract 3 consisted of the stable emulsion of the fat in the aqueous phase. In the experiments with dogs (present paper) and with rats (following paper) extract 3 was exclusively used; in the animal experiments an extract of the alcohol-soluble material from ox-liver tissue, prepared in a manner similar to that of the pituitary extract (extract 3) was used for control purposes.

TABLE I—INFLUENCE OF ORAL ANTERIOR-PITUITARY EXTRACTS ON HUMAN DIABETICS

(Results are average figures for three-day periods)

—	Pt.	Sex and age	Insulin dosage (units daily)	Control period		Experimental period	
				Average glycosuria (g. per day)	Average blood-sugar (mg. per 100 c.cm.)	Average glycosuria (g. per day)	Average blood-sugar (mg. per 100 c.cm.)
First extract	A	M.62	Nil	1·8	..	1·5	..
	B	F.31	400	108	..	96	..
	C	M.34	32	..	131	..	135
Second extract	B	F.31	400	108	..	99	..
	C	M.34	32	..	87	..	107
	D	M.29	48	..	154	..	162
Third extract	B	F.31	Nil	249	..	244	..
	C	M.34	24	..	124	..	116
	D	M.29	44	..	66	..	67

Estimations on blood and urine.—In the experiments with human beings blood-sugar was determined by the Folin-Wu method, and urinary sugar by Benedict's method; in the investigations with dogs the methods are those of Marks and Young (1939).

RESULTS

With human beings.—As Collip himself has given his extract for only 2–4 days no long-period experiment has been thought necessary and the effect of the extract has been observed on controlled diabetics for only 3 days. In all cases the diet in the control period before and during the administration of the extract has been constant, and in insulin cases the dosage has been unchanged.

TABLE II—INFLUENCE OF ORAL PITUITARY EXTRACT ON PITUITARY-DIABETIC DOGS

(Results are average figures for five-day periods)

—	*Dog* 111, *male, initial Wt.* 7·50 *kg.*						*Dog* 112, *male, initial Wt.* 15·60 *kg.*					
	Period 1	2	3	4	5	6	1	2	3	4	5	6
	Control	Pituitary extract	Liver extract	Liver extract	Pituitary extract	Control	Control	Pituitary extract	Liver extract	Liver extract	Pituitary extract	Control
				plus 5 units insulin						plus 5 units insulin		
Protein ingested daily (g)	190	172	152	113	149	161	407	334	296	297	300	394
Sugar excretion (g./day)	106	99	80	58	81	95	215	179	158	155	161	200
D/N quotient	3·31	3·40	3·13	2·88	3·27	3·48	3·04	3·09	3·12	3·06	3·15	3·02
Ketone excretion (g./day)	3·88	2·28	3·96	1·85	1·70	4·43	0·35	0·31	0·29	0·16	0·10	0·63
Body-wt. change (kg./day)	− 0·06	− 0·07	+ 0·05	− 0·06	+ 0·06	− 0·08	+ 0·01	− 0·01	− 0·01	+ 0·04	0·00	+ 0·03

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The total amount of pituitary extract administered daily was equivalent to 15 g. of fresh anterior lobe tissue. This was taken in three doses by mouth before meals. A few cases of mild, moderate and very severe type have been chosen and the results are seen in table I, which contrasts the figures obtained during control and "extract" periods for either the total glycosuria (g. of sugar excreted daily), or the blood-sugar concentration (mg. per 100 c.cm.) estimated at a standard time 4 hours after the morning insulin at the height of its activity. In the very severe case B the glycosuria has varied from day to day under strict control by as much as 50 g. and we consider the small differences in the tests, slightly in favour of the extract periods, to have no significance. The blood-sugar results are remarkably constant for such experiments on human diabetes and we consider that the observations clearly show no action of these pituitary extracts on the carbohydrate metabolism of such diabetic patients.

With pituitary-diabetic dogs.—Tests were made on two male dogs made permanently diabetic by the daily injection of anterior pituitary extract for a short period (Young 1937). As indicated in table II, dog 111 differed from dog 112 in having a slightly higher D/N quotient and a heavier ketonuria. Tests with the pituitary extract were carried out both when the dogs were receiving no insulin and when 5 units were administered daily. They ate as much horse meat (raw and cooked) as they would take each day but no carbohydrate food. It was not considered satisfactory to limit their food intake to a constant daily amount owing to the fall in body-weight which follows any limitation of the amount of meat eaten by these pituitary-diabetic dogs (Marks and Young 1939).

The amount of extract given daily (in the drinking water) was equivalent to 10 g. of fresh anterior-lobe tissue. It was usually taken within a period of an hour and a half.

The results given in table II indicate that no obvious influence of the pituitary extract on the D/N quotient, ketone excretion or body-weight of these animals was observed, either when no insulin was administered or when 5 units of insulin were injected subcutaneously each day in one dose at the same time as the pituitary extract was given. That the fall in sugar excretion which followed the administration of the pituitary extract was of no significance and was wholly due to the diminished appetite of the treated animals is indicated by the relative constancy of the D/N quotients. It is interesting to note that, in agreement with earlier results (Marks and Young 1939) the small dose of insulin was found to have little effect on the D/N quotient of these dogs, but nevertheless induced a definite diminution in ketonuria.

DISCUSSION

We have clearly failed to confirm Collip's claim that his extract "has a profound effect upon carbohydrate metabolism," in experiments with the diabetic organism. Collip (1940a) suggests that this extract exerts its effect through a "pancreotropic" action on the islets of Langerhans. In the following paper it will be shown that the extract has no obvious pancreotropic action, as judged from the insulin content of the pancreas of treated rats. No support can therefore be given to Collip's assertion that the oral administration of his extract exerts "an important anti-diabetogenic action."

SUMMARY

In experiments with human diabetic patients and with dogs made permanently diabetic by the administration of anterior pituitary extract for a short period no evidence was obtained to support Collip's claim that the oral administration of the "primary alcoholic extract of pituitary tissue" exerts a profound "anti-diabetogenic effect."

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PANCREOTROPIC FACTOR OF THE ANTERIOR PITUITARY LOBE

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(*From the National Institute for Medical Research*)

IN the preceding paper by Lawrence and Young it was shown that Collip's claim that the "primary neutral alcoholic extract" of anterior pituitary tissue exerts an antidiabetic effect when administered by mouth (Collip 1940) could not be substantiated in so far as experiments on human diabetics and pituitary diabetic dogs were concerned. Since Collip (1940) suggests the possibility that his extract exerts its effect by virtue of a "pancreotropic action," it seemed desirable also to investigate this point directly.

Marks and Young (1940) used the increase in insulin content of the pancreas of the male Wistar rat which had been treated daily for 14 days as a measure of the pancreotropic activity of an injected extract, and we have followed this method in an investigation of the identity and properties of the pituitary pancreotropic factor. It should be emphasised that investigations from this laboratory (Griffiths and Young 1940) and from the laboratories of Prof. C. H. Best (Haist and Best 1940, Haist 1940) have failed to provide evidence that the anterior pituitary lobe exerts a hormonic control over the islets of Langerhans of the pancreas; it therefore cannot be assumed that the pancreotropic substance extracted from the pituitary gland is secreted to produce this effect naturally.

METHODS

The methods, both biological and chemical, are almost entirely those of our previous publication (Marks and Young 1940).

Groups of 10 male Wistar rats were treated subcutaneously each day for two weeks with pituitary extracts, and then killed, after fasting overnight, and the appropriate dissections and estimations made. In every experiment a control group of rats untreated with pituitary extract was included.

The crude extracts of pituitary tissue either fresh or acetone dried were prepared, as previously described (Young 1938), by extraction with saline at pH 8·5. The ox prolactin preparation used was that fraction of the crude alkaline extract which was insoluble at pH 5–5·5 but completely soluble at pH 8. This fraction was dried by precipitation with alcohol and ether, and was found to assay approximately 5 I.U. of prolactin per mg. of dry powder. The alcohol-soluble fraction of ox pituitary tissue (Collip) and of ox-liver tissue (control preparation) were prepared according to the method described by Lawrence and Young (previous paper, extract 3). With one exception the amount of extract administered daily is expressed as the number of mg. of fresh anterior-lobe tissue required to prepare that amount of extract; this is described as "mg. equivalent of fresh tissue." In the case of prolactin the weight of the dried preparation given daily in solution is indicated.

For the experiments with sex hormones a tablet of the crystalline material was subcutaneously implanted in the rat according to the technique developed by Deanesly and Parkes (1937) and the animal killed in a fasting condition one month later.

RESULTS

In our previous investigation (Marks and Young 1940) we showed that a daily dose of crude alkaline extract of ox anterior lobe (described hereafter as "ox A.P.E."), equivalent to 125 mg. of fresh tissue, induced a substantial but not a maximal pancreotropic effect under our conditions. In a series of 15 experiments with this dose of ox A.P.E., in each of which groups of 10 injected and 10 control rats were used (table IA), the insulin content of the pancreatic tissue from the control groups was found to be 0·68 unit per 100 g. of final body-weight, with a standard deviation of ± 0·15 for a single experimental group of 10 rats, indicating a reasonable though not high

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degree of constancy among different groups. When the value for each group of injected animals was expressed as a percentage of the value for the corresponding control group the logarithmic average of the treated groups was 159%, with a standard deviation for a single value of ± 25%. If we take the customary limits of ± twice the standard deviation as representing the range of experimental variation, a percentage increment of 50 may be considered as significant in a single experiment. Using this criterion, we may consider all the values recorded in table IA as significant, while in table IB only the values for the experiment in which ox A.P.E. was injected into castrated male rats, and for that in which acetone dried ox pituitary tissue was used, can be considered as indicating a significant increase in pancreatic insulin content. Bearing in mind the above considerations we may, on the basis of the data in table I, draw the following conclusions about the pituitary pancreotropic factor.

Sheep pituitary tissue possesses about half the pancreotropic activity of ox tissue, while an extract of horse pituitary gland is inactive in the male rat.[1]

Griffiths and Young (1940) have shown that treatment with œstrogens substantially increases the insulin content of the rat pancreas; this is confirmed, with regard to the action of œstrone, by the data in table II. It

TABLE I—INFLUENCE OF ANTERIOR PITUITARY PREPARATIONS ON THE INSULIN CONTENT OF THE PANCREAS OF MALE RATS

Pituitary preparation administered	Amount given daily. (mg. equivalent of fresh tissue)	Total no. of rats treated.	Blood-sugar (mg./100 c.cm.)	Pancreas: Weight (g./100 g. of body wt.)	Pancreas: Insulin content (units/100 g of body wt.)	Percentage increment of experimental above control groups
(A)						
Crude ox extract	125	150	102	0·43	1·10 ± 0·066 [1]	62
None..	..	150	99	0·45	0·68 ± 0·040 [1]	..
Crude horse [2] extract	190	40	116	0·42	0·64	Nil
None..	..	40	106	0·47	0·72	..
Crude sheep extract	250	60	109	0·41	1·06	60
None..	..	60	110	0·43	0·66	..
Ox prolactin (1 mg. = approx. 5 I.U.)	10 mg.	40	100	0·41	1·18	74
None..	..	40	107	0·42	0·68	..
(B)*						
Crude ox extract ..	125	20	128	0·45	1·49	107
Extract of acetone-dried ox gland ..	125	20	130	0·40	1·08	50
	350	30	111	0·41	0·84	17
Alcohol-soluble ox pituitary fraction	750	30	107	0·41	0·71	Nil
Alcohol-soluble liver fraction	1500	20	102	0·39	0·74	3
None..	..	90	113	0·43	0·72	..
Crude ox extract heated at 100° C.:						
(*a*) pH 3 for 3 min.	300	17	..	0·42	0·64	5
(*b*) pH 3 for 15 ,,	500	9	..	0·47	0·35	Nil
(*c*) pH 7 for 3 ,,	500	8	..	0·38	0·76	25
(*d*) pH 10 for 3 ,,	500	8	..	0·38	0·55	Nil
(*e*) pH 10 for 60 ,,	375	18	..	0·56	0·58	Nil
None..	..	33	..	0·48	0·61	..
Extracts by mouth:						
(*a*) crude ox extract	250	20	142	0·41	0·80	18
(*b*) alcohol-soluble ox pituitary fraction ..	1000	10	124	0·39	0·78	15
(*c*) alcohol-soluble liver fraction ..	1000	10	131	0·30	0·54	Nil
None..	..	40	127	0·42	0·68	..

1. Standard deviation of the mean value.
2. Some extracts were prepared from acetone-dried whole pituitary glands.

* Castrated rats.

1. There is some evidence indicating that pancreotropic activity is present in horse pituitary extract, though its action is masked by that of other substances in the extract. An investigation into this aspect of the problem will be the subject of a further communication.

TABLE II—INFLUENCE OF SEX HORMONES ON INSULIN CONTENT OF THE PANCREAS OF THE MALE RAT

Hormone	Approx. weight of tablet implanted (mg.)	Amount of hormone absorbed per day	Total no. of rats treated.	Average growth (g./day)	Blood sugar (mg./100 c.cm.)	Pancreas: Weight (g./100 g. of body wt.)	Pancreas: Insulin content (units/100 g. body wt.)	Percentage increment of experimental above control groups
Œstrone ..	10	23 μg.	21	0·9	111	0·46	1·04	89
Control (cholesterol)	..	..	20	2·9	100	0·37	0·55	..
Testosterone	30	0·6 μg.	10	1·3	107	0·41	0·54	0
Control (cholesterol)	..	..	10	2·4	103	0·38	0·54	..

The animals were killed one month after implantation of the tablets.

therefore seemed desirable to determine whether or not the pancreotropic action of pituitary extract in our male rats was an indirect one, mediated by the gonads which liberated androgens under the influence of the gonadotropic action of the extract, the liberated androgens inducing the rise in the insulin content of the pancreas. The data in table IB show that ox A.P.E. is at least as effective in castrated male rats as in normal animals, while the results in table II indicate that treatment with testosterone, unlike the administration of œstrogens, does not induce a rise in the insulin extractable from the pancreas of the male rat. Thus there is no reason to believe that the gonads mediate the action of ox A.P.E. in raising the insulin content of the rat pancreas.

Our ox prolactin preparation is highly pancreotropic (table IA), but it should be remembered that the pseudoglobulin fraction of ox A.P.E., which contains no detectable prolactin, is also highly active (Marks and Young 1940).

Acetone-dried ox pituitary tissue retains some pancreotropic activity (cf. Richardson and Young 1937), but both alcohol dried tissue (Collip 1939) and the alcohol-soluble fraction of ox pituitary tissue (Collip 1940) are not significantly active. When either ox A.P.E. or the alcohol-soluble fraction of ox pituitary tissue was administered by mouth to rats daily for two weeks no significant pancreotropic effect was observed (table IB). When ox A.P.E. was heated to 100° C. for a short time at various pH values little or no significant pancreotropic activity remained, a result which presumably serves to differentiate the glycotropic and pancreotropic factors.

The data in table I show that treatment with pituitary extracts under the conditions of our experiments exerted no obviously significant influence on the weight of the pancreas of the rat (expressed as g. of pancreas per 100 g. of final body-weight), or on the fasting blood-sugar level, although the latter was usually slightly raised.

DISCUSSION

The results of experiments with pituitary tissue from different species show that, while the sheep gland has about one-half the activity of ox tissue, horse pituitary tissue is inactive as judged from experiments with male rats. Since the horse extract is actively gonadotropic, while ox A.P.E. is only moderately so, we may provisionally assume that the pancreotropic factor cannot be identical with the gonadotropic substances, a conclusion supported by the substantial pancreotropic activity of the prolactin preparation, which fraction contains only a trace of gonadotropin.

Although the prolactin fraction we have used is highly pancreotropic it seems improbable that the pancreotropic factor can be identical with prolactin per se on the basis of the following considerations. 1. In our previous investigation (Marks and Young 1940) the pseudoglobulin fraction of ox A.P.E., which was free from detectable prolactin, was found to be highly pancreotropic. 2. The daily dose of ox A.P.E. which gives substantial

pancreotropic activity contains approximately 10 I.U. of prolactin, whereas the effective daily dose of our prolactin preparation possessed approximately 50 I.U. of prolactin. 3. Sheep pituitary tissue is rather more rich in prolactin than tissue from the ox gland (Chance, Rowlands and Young 1939), whereas the sheep A.P.E. has only about half the pancreotropic activity of ox A.P.E. The fact that our prolactin fraction possessed only traces of thyrotropic activity renders it unlikely that the pancreotropic factor can be identical with the thyrotropic substances. As already pointed out, the relative heat instability of the pancreotropic factor differentiates it from the glycotropic substance.

The negative results of the experiments on the alcohol-soluble fraction of ox pituitary tissue (Collip) given by injection, and of those on the oral administration of this extract or of ox A.P.E., offer no support for the suggestion by Collip that any effect on carbohydrate metabolism of his primary alcoholic extract administered by mouth is due to its pancreotropic action.

SUMMARY

The pancreotropic activity of different anterior pituitary preparations has been investigated, using the ability of such preparations to induce a significant rise in the insulin content of the pancreas of the male Wistar rat treated daily with extract for two weeks as an index of pancreotropic activity.

The pancreotropic activity of sheep pituitary crude extract was found to be about half that of ox pituitary extract, while horse pituitary extract was found to be inactive under comparable conditions.

Although a preparation of prolactin possessed a high degree of pancreotropic activity considerations are advanced for believing that the pancreotropic factor (which is probably not a hormone) is not identical with prolactin, nor with the gonadotropic, thyrotropic or glycotropic substances. Treatment with testosterone, unlike treatment with œstrogens, does not raise the insulin content of the pancreas of the male rat, and the pancreotropic action of pituitary extract appears not to be mediated by the male gonads.

Collip's primary neutral alcoholic extract of pituitary tissue was found not to be significantly pancreotropic when administered to rats either by subcutaneous injections or by mouth.

We wish to thank Dr. A. S. Parkes, F.R.S., for tablets of œstrone, and we are grateful to Messrs. Boots Ltd., and to Messrs. Ciba Ltd., for supplies of pure diethylstilbœstrol and testosterone.

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TREATMENT OF IRREPARABLE RUPTURE OF THE URETHRA

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ALTHOUGH rupture of the urethra is comparatively rare, war injuries resulting in fracture of the pelvis and dislocation of the pubic bones are likely to increase the hazard of this trauma. The damage to the urethra may, at first, be overshadowed by other more obvious injuries, and the consequent delay in recognising and treating the urethral injury may prove fatal. Inadequate or misdirected treatment may initiate a course of events which ends with the patient in a state of chronic ill health and misery. In unoperated rupture, stricture follows within a few weeks, and, if periurethral suppuration and sloughing occurs, the extent and density of the stricture may be such as to render it irreparable. It was this end-result that had to be dealt with in the case described here.

CASE-RECORD

A glass polisher, aged 22, had been admitted to the Glasgow Royal Infirmary in October, 1936. He had fallen off his bicycle and was then run over by a motor lorry, a wheel of which was said to have passed over his abdomen. After being treated for shock his abdominal cavity had been explored. No visceral injury was found, though extravasation into the mesocolon and some blood-stained fluid in the pelvis was noted. The bladder was seen to be distended and a suprapubic cystostomy was performed, after an attempt to pass a catheter into the bladder had failed. Subsequent radiography revealed multiple fractures of the pelvis involving the ileum, the pubic rami and ischia. A month after the accident an attempt was apparently made to deal with the ruptured urethra by perineal section and retrograde catheterisation, and during the next three months he had eight further anæsthetics, when bougies and catheters were passed. He never succeeded in micturating and was ultimately discharged from hospital with a suprapubic tube. Suprapubic drainage was maintained for the ensuing four years, until January, 1940, when he was referred to the urological department.

He was then in a rather miserable condition. Urine was leaking around the suprapubic tube, and also from two sinuses on the inner aspect of the left thigh. In the perineum, a hard indurated mass could be felt over and around the urethra, between the root of the scrotum and the anal orifice. An impenetrable obstruction in the region of the bulbous urethra was encountered by a steel sound. The urine was grossly infected and radiography of the urinary tract showed a large branching calculus in the left kidney, forming a cast of the pelvis and calices. On intravenous pyelography no secretion of the injected medium came through on the left side, while the right kidney was represented by a normal pyelographic shadow. Under spinal anæsthesia an external urethrotomy was carried out, the indurated periurethral tissue being at the same time excised. The roof of the urethra was found intact and it was possible to identify the distracted edges of the floor and to approximate these by suture around a catheter, which had been guided into the bladder. The result of this operation was poor. During the ensuing six weeks he would pass on some days as much as 40 oz. urine, but on others only 2–3 oz. were collected. The passing of bougies became increasingly difficult and finally the entire urinary output was again coming through the suprapubic fistula and the sinuses on the thigh. It was now considered that the chances of repairing the urethra were remote and deviating the urine into the pelvic colon seemed the only alternative to a permanent cystostomy. The extensive calculus formation in the left kidney contra-indicated transplanting the ureter of that side. The plan of procedure decided on, therefore, was to transplant the right ureter into the pelvic colon and thereafter to remove the left kidney.

After three weeks at the convalescent home, transplantation of the right ureter into the pelvic colon by the Coffey no. 1 technique was carried out. He made an uneventful recovery from this operation and twenty-four days later the left kidney was removed. This operation was likewise followed by a smooth convalescence and three weeks later he was finally discharged from hospital. He was by then voiding urine per rectum about four-hourly during the day and could sleep for seven to eight hours at night without disturbance. The suprapubic sinus was completely closed as were also the two sinuses on the thigh.

Now, seven months later, he is working an eight-hour day as a clerk, and a recent intravenous pyelogram showed excellent concentration in the right kidney within five minutes, and no dilatation in the ureter or renal pelvis in films taken up to thirty minutes.

COMMENTS

Rupture of the bulbous urethra is the result of a crush between the injuring body and the pubis and is more common than rupture of the posterior urethra. It is followed by hæmorrhage from the meatus and a rapidly forming perineal swelling. Retention often though not always supervenes. Rupture of the posterior urethra is due to severe injuries involving fractures of the pelvis or dislocation of the pubis. Hæmorrhage is slight and some days may elapse before swelling in the perineum occurs. Since the rupture is a complete one, however,

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retention is absolute and a distended bladder is early apparent. On rectal examination a tender swelling can be felt over the membranous or prostatic urethra.

Early treatment is called for, not merely to relieve the retention, but to prevent the minimum of permanent damage to the urethra. If there is no perineal swelling, and if a catheter can be passed into the bladder without difficulty, then it should be tied in and left for a few days. Thereafter bougies can be passed at intervals. If a catheter will not pass, and if a perineal swelling is present, operation should be carried out. The hæmatoma should be incised, clots turned out, and the torn edges of the urethra united over a catheter. In complete tears the most careful search may fail to reveal the severed vesical end, but it can be readily identified by passing a bougie along the urethra from the bladder, through a suprapubic cystostomy opening. In any event, suprapubic drainage should be temporarily established in all cases operated on. A catheter should be retained in the urethra for several days when the posterior urethra is involved, but need not be kept in for the bulbous variety after the torn edges have been united. Bougies should be passed at regular intervals, beginning about a fortnight after operation.

In old-standing irreparable cases, who have been subject to multiple operations, it should not be concluded that the patient must be condemned to a permanent suprapubic cystostomy, particularly if he is a young man. It is in these cases that deviation of the urine from the bladder by transplanting the ureters into the pelvic colon is indicated.

SUMMARY

Irreparable rupture of the posterior urethra need not condemn the patient to a permanent suprapubic tube. In a case described transplantation of the ureter of the one good kidney into the pelvic colon and removal of the other kidney, which was the site of a massive calculus, enabled the patient to resume an active life after four years of invalidism.

PREVENTION OF ACUTE ADHESIVE OBSTRUCTION

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THE danger of acute intestinal obstruction threatens all patients who have once suffered from peritonitis. Bands or adhesions which have been symptomless for years may suddenly bring about the catastrophe. Yet we are uncertain of the factors which precipitate the attack, and therefore have been unable to advise these patients how best to safeguard themselves. This uncertainty arises primarily from a failure to distinguish between the two types of small intestinal obstruction—strangulation and simple obstruction. In the former, where a loop of intestine slips under a band in such a way as to occlude both its lumen and its blood-supply, the element of chance is so obvious that there has been a tendency to regard all adhesive obstructions as acts of God, and not to inquire too minutely into how they came about. If, however, simple obstruction alone is considered (and it is much the commoner of the two) it will be realised that there are only three ways in which a band or adhesion can affect the intestine—by encroaching on its lumen by pressure, by causing kinking, and by limiting its mobility.

It is the purpose of this paper to demonstrate that the catastrophe of obstruction is commonly produced by two simple mechanisms, both largely preventable. The first (fig. 1) is the impaction of a bolus of semisolid intestinal contents at the point narrowed by the band, the second is the excitation of excessive peristalsis either by a food bolus or by strong purgatives. The vigorous peristalsis rapidly drives the contents down to the hampered portion of intestine. Here the portion of intestinal wall which is fixed cannot equally participate in the mass waves of peristalsis, with the result that food is held up and distends the loop immediately above. If the distension is sufficiently great the intestine may become kinked at the fixed point and complete obstruction result (fig. 2).

The reason that a bolus of food is not more often found at operation is that by the time the surgeon explores the abdomen the accumulated intestinal juices churned by peristalsis have led to its disintegration, and vomiting has played a part in its removal. This may indeed cause the attack to subside as is shown by the number of previous attacks experienced by these patients, and Wangensteen and Paine (1933) have proved that the majority of even fully established cases of obstruction will settle down if the distension can be relieved by suction applied to a duodenal tube. Much of our knowledge of acute abdominal disease has been gained in the operating-theatre and post-mortem room, and since it is unusual for patients to reach either place soon after a large meal we have been accustomed to see the small intestine empty, so that the importance of the physical state of its contents has been underrated.

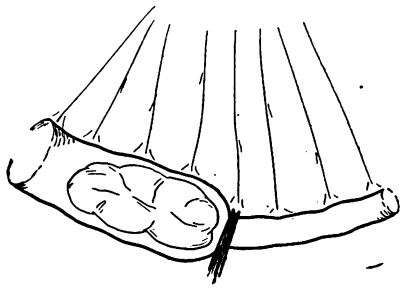

FIG. 1—Obstruction precipitated by impaction of bolus at point narrowed by band.

In a previous paper (Latchmore 1940) I reported 7 cases in which indigestible food became impacted in the normal small intestine. In 4 of these actual obstruction developed requiring surgical relief. In the others natural recovery followed the passing or vomiting of the food. If impaction can take place in normal patients it is clearly much more likely to do so in intestines stenosed by bands or angulated by adhesions. Yet there are few references in the literature to this as an important and preventable precipitating factor in acute adhesive obstruction. Elliott (1932) suggested that it must occur but produced no cases. Schlicke (1940), in a search for precipitating factors in 45 cases of simple obstruction of the small bowel, found that in 6 the attack had followed the oral administration of barium and in 3 the use of a strong purgative, but he does not mention foodstuffs. Lewis, Shapiro and Vaughan (1940) state that in patients with mild chronic adhesive obstruction "Symptoms appear only when the lumen of such a damaged bowel becomes blocked by a large meal of relatively indigestible foods such as coarse vegetables or dried fruits." In order to obtain evidence on this point, I examined a series of patients who had been operated on during the last eight years at the Leeds General Infirmary for acute adhesive obstruction. From this investigation it became clear that eating indigestible foods had such an important relationship to the onset of acute intestinal obstruction that it should be the duty of the surgeon, in all cases of severe peritonitis and other conditions where adhesions are likely to develop, to warn the patient of this danger. The following histories demonstrate the relationship.

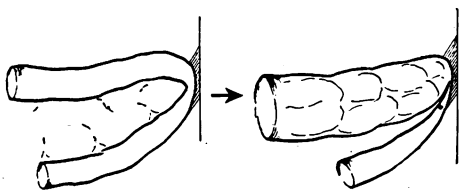

FIG. 2—Peristalsis is defective where bowel is adherent. Excessive peristalsis due to bolus or aperients drives contents down to hampered portion more quickly than they can be passed on. Distension therefore occurs above adhesion and kinking may precipitate obstruction.

CASE-RECORDS

CASE 1.—A tailoress, aged 24. Two years after operation for appendicitis she ate a pork pie and biscuits for lunch. This was followed by colic and vomiting which continued for three days, when she was operated on for obstruction due to the small intestine being adherent to the scar. After the

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operation she remained subject to attacks of pain and distension. A year later she ate a meal of cold pork and bread in the evening on her return from work, and the attack which followed was so severe that her doctor was sent for in the small hours. At the time of these attacks she had very defective teeth, and she has been much better since artificial teeth were fitted.

CASE 2.—A taxi-driver, aged 30, had attacks of colic for a year which increased in number and severity until he hardly dared to eat. One day he had a pint of tea and two meat pies for dinner in a drivers' road-shelter. This was followed by an attack of colic which persisted until he was operated on next day for obstruction due to a band passing to a tuberculous mesenteric gland.

CASE 3.—A miner, aged 40, had repeated attacks of colic. One of the most severe followed the eating of apples. For the last five years he had suffered from attacks of flatulence and pain, which became so severe that he had recently been off work under treatment for gall-stones. On the first day back at work he ate half a small pork pie and some roast pork for tea. This produced a return of his symptoms, which continued until he was admitted with subacute obstruction. At operation a band was found constricting the small intestine 18 in. from the cæcum and lumps of undigested food were palpable in the loop above the obstruction.

CASE 4.—A storeman, aged 43, had uncomfortable false teeth which he removed at meal times. While working at a military hospital he ate a lunch cooked for the soldiers, which included hard haricot beans. That afternoon he was seized with pain, and at operation next day a loop of ileum was found loosely snared by a band and packed tight with beans. After division of the band these could easily be pushed onwards into the cæcum.

CASE 5.—A motor driver, aged 36, had appendicitis with peritonitis many years ago, and since then had had occasional attacks of colic, mostly after eating pork or pork pies. One day he took a pork pie and tea for lunch and an hour afterwards had violent diarrhœa. This passed off after a few hours, but was followed by colicky abdominal pain which continued for three days, when he began to vomit. He was admitted to hospital a week after the onset with subacute adhesive obstruction with a ladder-pattern abdomen. He was treated with intravenous saline and suction through a Miller-Abbott tube and settled down. Solid food was begun too early and he again became obstructed and had to be operated on. Massive adhesions were found involving the lower ileal coils and causing subacute obstruction.

CASE 6.—A girl shop assistant, aged 17, had appendicitis with peritonitis in 1929. Shortly after her discharge from hospital she had an attack of abdominal pain after eating an apple dumpling. This attack was said to be due to adhesions, and it soon subsided when she was admitted to a nursing-home. After this she had several attacks of pain, and in 1935 was operated on for acute obstruction due to a band. Since then she had still had attacks of pain and distension. Without prompting she enumerated the following foods which bring them on: coconut, whether raw or in cakes, bananas, cauliflower, nuts, cabbage, peas and onions. On the Sunday before I interviewed her she bolted an apple and had such severe pain after it that she had to go to bed for the day.

CASE 7.—A driver's mate, aged 37, who had had an appendicectomy with drainage. After having had various attacks of colic he one day ate a currant pasty in a roadside shelter for lunch. This brought on pains which persisted until his admission. At operation an acute obstruction of the ileum was found due to an adhesion to the mesoappendix.

COMMENTS

These histories speak for themselves. The foods blamed are very similar (pork in one form or another in three out of the seven cases, and pastry in six), and they are all foods well known to be indigestible, which, if improperly chewed, could enter the small intestine still in semi-solid form. Many of these patients had also suffered from lesser attacks of pain and distension after eating the other foods which I have previously shown (Latchmore 1940) to be liable to bolus formation in the small intestine —raw hard fruits, especially if unskinned, nuts, coconut, currants, cabbage, hard peas and beans and so on. The danger lies not only in the character of the food but in the way it is eaten. When taken in the middle of a large meal such foods pass through the small intestine diluted by much innocuous soft food residue. When taken alone they are moulded into a bolus by peristalsis and tend to become impacted. Thus the most dangerous type of meal is one in which meat pies, pork sandwiches or the like are eaten alone, swilled down by tea, and often bolted from haste or hunger. It is noteworthy that two of these patients were drivers of commercial vehicles and a third a driver's mate who ate the offending meals at roadside shelters or stalls. Insufficient mastication due either to defective teeth or inadequate use of them is obviously a most important factor. None of these foods would cause trouble if they were ground into pulp before leaving the mouth. The mere overloading of the small intestine with large meals would clearly be likely to have similar effects, and several of these patients have noticed that attacks of pain have been brought on by an exceptionally heavy meal.

Aperients.—Schlicke mentions three cases of simple small-bowel obstruction in which the onset was precipitated by the use of aperients. None of the patients I questioned blamed this for their attacks, but in reply to a questionnaire 11 out of 52 patients who had been operated on for general peritonitis due to appendicitis, and some of whom were likely to have adhesions, stated that they had suffered from attacks of pain after taking aperients.

PROPHYLAXIS

These patients have been left to find out by experience which foods their hampered intestines would no longer tolerate, and 7 of them paid the price of an attack of acute intestinal obstruction, whereas they could all have been saved pain and danger by suitable instructions on leaving hospital after their original operation for peritonitis. I suggest that all such patients should be given advice and put on a slightly restricted "post-peritonitis" diet before they are sent home. The following instructions appear to be suitable.

1. Ensure that you have an efficient set of teeth, whether natural or false.
2. Always eat slowly and chew thoroughly.
3. Avoid heavy meals; more frequent smaller ones are safer. Ensure that the main meal of the day, whether at midday or in the evening, is a "dinner"; avoid the "high-tea" type of meal. Be moderate in the consumption of meat and never eat tough meat.
4. Avoid coconut, nuts, nut chocolate, hard fruit, fruits with skins (unless peeled), hard peas and beans, pork, meat pies, pastry, bran and dried fruits.
5. Never take strong aperients.
6. If you do have an attack of abdominal pain put a hot-water bottle, hot flannels or a poultice on your abdomen and have some warm drinks. If it persists more than an hour or two send for your doctor.

SUMMARY

In 7 cases of acute adhesive obstruction the onset had been precipitated by an unsuitable meal.

Two important precipitating factors in simple obstruction from adhesions are (1) impaction of a bolus of indigestible food at the stenosed point; and (2) excitation of excessive peristalsis, either by a bolus or by strong aperients. Where a portion of the intestinal wall is adherent it cannot participate as well as the rest in peristaltic movements, with the result that food is held up, causing distension of the loop above. This distension, if sufficiently great, produces obstruction by kinking.

Both these factors can largely be eliminated by efficient mastication with the avoidance of indigestible foods and strong aperients, and such advice should be given as a routine to all patients on their recovery from severe peritonitis.

I wish to express my thanks to the honorary surgical staff of the Leeds General Infirmary for their permission to investigate and publish these cases.

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BLINDNESS FOLLOWING HÆMATEMESIS

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Amaurosis following severe hæmorrhage is comparatively rare but has been long recognised, having been mentioned by Hippocrates. It usually arises in cases of profuse and repeated hæmorrhage from the bowel or the uterus, but is almost unknown in cases of severe traumatic hæmorrhage. De Wecker was unable to find an example in the Franco-Prussian war. Terrien (1927) recorded a case in a French soldier in the war of 1914–18 who was wounded, and lay for four days on the battlefield unconscious from severe hæmorrhage. When seen in hospital twelve days after the injury the vision of the right eye was reduced to counting fingers, and that of the left eye to hand movements only. There was blurring of the disc edges with some peripheral contraction of the fields of vision. Visual acuity gradually improved to 6/60 in the right eye, and to counting fingers in the left. There was post-neuritic atrophy of both optic discs.

The fact that amaurosis occurs so seldom among war casualties suggests that there is probably a toxic factor in the production of the condition, possibly due to severe hæmolysis.

Barr (1934) quotes a case in a woman of 32 whose vision in the right eye was 6/36 and the left 6/12 after severe postpartum hæmorrhage. When examined a fortnight later there was well-marked neuroretinitis with swelling of the optic discs of three dioptres.

Rugg-Gunn (1938) reported the case of a man of 47 who, after severe hæmatemesis of some days' duration, became completely and permanently blind. In this case the red-cell count was reduced to 1,300,000. He also quoted two other cases, one after severe gastric hæmorrhage and the other after severe uterine hæmorrhage, in which the blindness was not permanent. Whiting expressed the opinion that amaurosis was likely to occur if the hæmoglobin fell below 50%. The opportunities for pathological investigation of such cases have been rare, but in the eyes which have been sectioned a generalised œdema of the retina has been found associated with degeneration of the ganglion cells.

CASE-REPORT

We have recently had the following case under our care.

A man of 46 was admitted to hospital on June 7, 1940. On May 26 he had had a severe hæmatemesis and another on May 29. He was kept in bed and treated by his own doctor. On May 31 he noticed that his sight was failing, and he gave a clear description of a gradual concentric contraction of the fields of vision. On June 4 he could not distinguish anything. During the previous six months he had experienced epigastric pain at regular intervals, both by day and by night.

His general condition was good; he was pale, but did not look profoundly anæmic; a few teeth were decayed. His arteries were not thickened and the cardiovascular system was normal, his blood-pressure being 90/60. The pulse was regular, and its rate varied between 72 and 88 during the first two days. Blood-count: red cells 2,340,000; Hb. 41%; white cells 7000. Urine normal. Both eyes were completely blind, the pupils being widely dilated and inactive to light. There was marked œdema of the retina at the posterior pole, with one dioptre of swelling of both optic discs, the edges of which were indistinguishable. All the retinal vessels were attenuated; there was no cherry spot at either macula.

He was given subcutaneous injections of acetylcholine on admission, without any improvement of sight. He was also treated with the regime usual for gastric ulcer, feeds being given regularly. Iron and ammonium citrate, gr. 30, was given three times a day from June 9. On June 10 the stools were free from occult blood; four subsequent tests were also negative. The Wassermann reaction was negative. On the 12th he was given a transfusion of a pint of blood; on the 30th the hæmoglobin was 43% and the red cells 3,800,000; on July 3 the hæmoglobin was 70% and the red cells 5,400,000. At this stage he was allowed out of bed. From June 15–19 his weight increased from 9 st. to 9 st. 9 lb. There was no further gastric hæmorrhage. He left hospital on July 20 in good general condition, but completely blind. The blindness has, of course, persisted.

The early symptoms in this type of amaurosis are not constant. Reported cases vary. Some show first a diminution of central vision, others paracentral scotomata; occasionally there are sector field defects; in this case a typical concentric contraction of the fields was noticed by the patient.

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Reviews of Books

Injuries of the Jaws and Face

By W. Warwick James, F.R.C.S., L.D.S., consulting dental surgeon to Middlesex Hospital; and B. W. Fickling, F.R.C.S., L.D.S., assistant dental surgeon to St. George's Hospital. London: John Bale and Staples. Pp. 193. 15*s*.

This book is based on experience in the last war, and in view of the dearth of books on this subject its appearance is welcome. It should be of great use to dental surgeons who may be required to coöperate in the treatment of these injuries. The book is generously illustrated, and the reproductions of radiograms and photographs of splints and models are particularly instructive. The general instructions for the early treatment of the patient and his wounds are well set out. In the treatment of the hard tissues the authors' preference is for interdental wiring, though cap splints are also used in the later stages. In recommending retention of teeth in the line of fracture the authors are at variance with the views of many other authorities, which are not mentioned. Most of the book is about fractures of the mandible, while fractures of the maxillæ, nasal bones and zygoma are dealt with in a few pages. The later repair of the soft tissues and the many operations which fall to the lot of the plastic surgeon are not described, except for a useful chapter on bone-grafting. Since the treatment of fractured jaws cannot be divorced from the treatment of the soft tissues this is an important omission, and limits the value of the book; but as a work of reference for the dental surgeon dealing with war injuries it can be strongly recommended.

Lectures on Diseases of Children

(8th ed.) By Sir Robert Hutchison, Bt., M.D., LL.D., P.R.C.P., and Alan Moncrieff, M.D. Lond., F.R.C.P. London: Edward Arnold and Co. Pp. 471. 21*s*.

Sir Robert Hutchison's lectures have been popular for a generation. The new edition has fresh illustrations and some modification of the text, three of the lectures (on infant feeding and prematurity) having been excellently rewritten. Many of the rest are little altered and thanks to Dr. Moncrieff's skill the book has not lost its unique quality.

Aids to Ophthalmology

(9th ed.) By N. B. Harman, M.B. Camb., F.R.C.S., and P. McG. Moffatt, M.D. Lond., M.R.C.P., F.R.C.S. London: Baillière, Tindall and Cox. Pp. 284. 4*s*. 6*d*.

The text of this edition has been thoroughly revised, some old matter discarded and rather more new introduced. The chapters on war injuries and on ocular therapeutics are well balanced and contain much practical information. The authors have tried to bring their notes on the visual standards required for admission to the fighting services up to date but these were changed during the preparation of the book. Seven pages seems too many to give to a description of tenoplasty, a reefing operation for the surgical correction of squint, but in the next edition space might be found for a brief description of the importance of achieving akinesia as a preliminary to an intraocular operation by barraging branches of the facial nerve with Procaine, and a note about the intravenous administration of sodium pentothal as an anæsthetic. The book is lucidly written, and the type is more easily readable than in previous editions.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

AT a meeting of this section held on Nov. 26 the chair was taken by the president, Sir MAURICE CASSIDY, and Dr. F. G. CHANDLER opened a discussion on the

Treatment of Traumatic Hæmothorax

Thoracic surgery, he said, had shown remarkable achievements since the last war, partly owing to the experience of that war. Few today thought treatment by abortive drugs of much value. The exploring needle was essential for diagnosis and treatment, and should be harmless and painless. The physical signs were very variable and might be most peculiar, even simulating pneumothorax with fluid of any kind; bronchial breathing was common. The value of X rays, both in diagnosis and subsequent control, could not be exaggerated. The problems of treatment could not be reduced to a simple one, for the hæmothorax might be simple, or infected, or complicated by many features. If the dome of the diaphragm were obscured in a radiogram there was probably half a pint of fluid or more and the condition was approaching the stage at which active treatment was essential. If infection was present drainage was urgent; there must be no waiting for toxæmia. The temperature might be no guide, often being raised in uninfected cases. Complications might include open wound of the thorax; indriven splinters of bone, missiles or clothing; damage to lung, with or without retained foreign body; pneumothorax, valvular or otherwise; perforation of the diaphragm, and injuries to other parts. These cases were matters for a specially trained surgeon. The first necessities for the simple non-infected case were rest; relief of pain and shock, cough and blood loss; and promotion of sleep. Sulphonamides would probably be used, but they could not entirely prevent infection, nor would they cure it when it had started. A small uninfected pneumothorax needed nothing more; for other cases the needle should be used within 24 hours. Every case must be treated on its merits; aspiration might be needed in a few hours or not for a few days. The replacement method, preferably using air, gave complete safety. If much blood were left, the sequelæ might be pleural thickening, inadequate expansion and calcification. Oxygen had no advantage over air and complicated the technique.

The patient should lie comfortably on his back and a point midway in the axilla should be anæsthetised, remembering that the diaphragm was usually high. Air could be introduced through the aspiration needle or cannula, or two interspaces higher. The cavity could be left open to the air, making replacement automatic. To aspirate any quantity of fluid without replacement was highly dangerous. Watch must be kept for the reaccumulation of fluid, preferably by X rays. Exploratory puncture must be performed if fluid appeared. In due time, breathing exercises and restoration of function were an essential feature of after-treatment.

Mr. G. A. MASON said that intrathoracic bleeding was apt to cease spontaneously at an early stage. Too much reliance should not be placed on a strong slow pulse, which might indicate a damaged autonomic nervous system. Rise of temperature might indicate further hæmorrhage or infection and called for investigation. A rising leucocyte count, the presence of organisms in fluid withdrawn, the general clinical picture and bad odour of the fluid indicated infection. Massive clotting might occur and might be absorbed or become calcified. Mr. Mason preferred not to operate for clot unless there were also infection. If there was no evidence of progressive hæmorrhage or involvement of the abdominal organs, a major operation should not be undertaken for small non-sucking wounds. Radiological examination before operation should be made carefully, showing anteroposterior and lateral views, upright and recumbent—or lying on back and side. Preparation for operation included rest, morphia, transfusion, oxygen and blockage of afferent stimuli. Blood was evacuated by suction or gentle use of absorbent pads. A Bipp-impregnated pack could be left in the chest for the control of hæmorrhage. If the parietes could not be closed because of damage to the tissues, tampons must be arranged, care being taken to see that they did not press on the great veins on the right hand side, and to supply syphon drainage below them. The principal objectives were to restore the function of the chests and to secure complete occlusion of the pleural cavity.

Dr. CLIFFORD HOYLE said that in the last war traumatic hæmothorax had had no mortality after the first two days provided it remained sterile. But infection occurred in a third of the patients and gave a bad prognosis both for death and for invalidism. The total toll was high. The presence of traumatised lung tissue was extremely important. In the simple form the hæmothorax was the chief lesion and cases did well; in the compound form hæmothorax was merely an incident and the patients did badly on conservative treatment and needed operation. Distinction was therefore vitally important. Lateral and anteroposterior radiograms of good quality were essential. Treatment in the early stages—the first few hours—was the same for all types of case; patients should be rested and given morphine for relief of pain, anxiety and insommia; morphine did no harm and might facilitate cough. They needed reassurance badly; hyoscine and phenobarbitone had their place. Transfusion—preferably with blood—was often useful. If there was increased intrapleural pressure the blood should be aspirated and replaced by a lesser quantity of air. A simple hæmothorax might produce no symptoms; a sample of the blood should be obtained to confirm the diagnosis and exclude infection; bacteriological report was necessary for this. Effusions took weeks or months to absorb, but could be removed surgically in an hour, and the lung could be re-expanded and the pleural sac replaced at the same time. Re-expansion was rapid, especially if helped by expiratory breathing exercises. Among the difficulties of air replacement was dry tap, usually due to trying too low. Villous tags might block the cannula. The end of the cannula might, in the posterior position, come into contact with expanding lung as the blood was withdrawn; this was overcome by injecting air. Most failures were due to the choice of too small a needle or cannula. Otherwise failure was due to solid hæmothorax, which should be evacuated. "Compound" hæmothorax meant complication by damage or foreign body. Injury to the lung was difficult to estimate, but of great importance. Surgical treatment allowed excision of wounds and traumatised lung, complete drainage and arrest of hæmorrhage; it could only be performed within a limited period, but gave dramatic results. The incidence of infection ran parallel with the incidence of retained foreign body. Infection must never be forgotten, it might occur several weeks after the injury. Often the only diagnosis was by aspiration, which was also the only treatment for the early stages. A tube must not be used too early, or loculation would prejudice recovery. The nutrition must be maintained as far as possible; these patients readily developed bedsores.

DISCUSSION

Mr. J. E. H. ROBERTS confined his remarks to the simple type. He found that if X-ray reports spoke of "a little fluid in the costal angle" he would aspirate 10–14 oz. He would aspirate on the third or fourth day unless there were contra-indications. Clotting was by no means exceptional; he believed that aspirated blood failed to clot because it had already clotted and not because of any anti-coagulant factor. It could not be absorbed in a clotted state, and a proteolytic ferment was not readily forthcoming in a sterile pleura and so the clot became organised, producing gross dysfunction. Therefore the blood in a hæmothorax should always be removed. If aspiration with air replacement failed, two cannulæ could be used, breaking up the clot through one tube. By the tenth day it was too firm to break up and the chest must be opened. After saving life restoration of function was the next object, and breathing exercises were very important as soon as the patient was fit for them. The only criteria of infection were the odour and tests of a removed sample. He did not like repeated aspiration, which was intermittent and incomplete drainage; he preferred to use a self-retaining catheter

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stretched through a smaller cannula. Practically all cases required a later rib resection. Collapse was always due to bronchial obstruction, usually by blood clot; that obstruction should early be removed by suction through a bronchoscope, as otherwise a large proportion failed to re-expand.

Dr. J. L. LIVINGSTONE had found that simple infected hæmothorax was apt to go on to chronic empyema, and advised aspirations from time to time until, as far as possible, the pus was at the back and the lung in front. He had found a good deal of difficulty in gas replacement and felt there was a risk of infection if it were done in a ward. Anaerobic cultures should be used in diagnosing infection, but immediate smears were valuable.

Mr. TUDOR EDWARDS remarked that traumatic cases with no penetration of the chest were increasing in number under bombing. He favoured early removal of the contents of the pleura—within a few hours—and air replacement. This would stop bleeding from the lung, but not from the chest wall, and showed up quite small foreign bodies on an ordinary X-ray film. Many infected effusions yielded no organisms at an early stage if the fluid were drawn from too high up.

Mr. V. C. THOMPSON emphasised the difficulty of separating the treatment of hæmothorax from that of chest wounds. No difficulty had been found at the Harefield Chest Centre in aspirating the blood and cases had cleared up well. In most cases the percentage of hæmoglobin in the fluid had been below 20. There was often serious loss of blood protein, which should be replaced by transfusion. The importance of using a syringe with some valvular mechanism was often overlooked. Air should not be allowed to enter the chest in an infected case, as it might make a complete empyema instead of a small posterior pocket. Air replacement was purely an emergency procedure to collapse a lung and stop bleeding; to get re-expansion the air had to be removed as soon as possible. Breathing exercises gave remarkable improvements.

Mr. C. PRICE THOMAS said clotting might occur without infection and demanded removal. It was very difficult to keep an intercostal tube airtight. One complication which needed early recognition was the occurrence of acute dilatation of the stomach.

Mr. R. C. BROCK stressed the importance of differentiating between the "simple" and "compound" type. He preferred early aspiration, but patients usually needed 12–18 hours' rest first. In practice, the presence of a large hæmothorax often obscured the complication. A fractured rib, damaged costal cartilage or a sucking wound put the case into the "compound" group requiring surgery. If blood welled out with respiration, the wound might be called a "leaking" hæmothorax which was alarming, but should not preclude bold intervention. A large infected clot was most difficult to deal with, and the correct treatment was prevention.

Mr. C. O. S. TUBBS thought that even repeated aspiration sometimes gave misleading results, yielding a sterile fluid in infected cases if there were pus in some loculi and not in others. Chemotherapy was very valuable prophylactically.

SECTION OF ORTHOPÆDICS

A MEETING of this section was held at Hill End Hospital, St. Albans, on Nov. 30 with the president, Mr. S. L. HIGGS, in the chair, when Prof. FELIX BAUER presented a paper on the

Functional Treatment of Congenital Dislocation of the Hip

Mr. KENNETH PRIDIE, who read the paper, explained that Professor Bauer was orthopædic physician to the Municipal Hospital in Vienna, and had gained much of his experience in a routine examination of the hip-joints of Viennese children in a search for the earliest signs of this deformity. The condition is much commoner in Austria than in this country. It was his experience of the Lorenz method of fixed immobilisation, said Professor Bauer, that had led him to adopt what he termed the functional treatment. Fixed plaster methods led to stiffness of the joint and lack of development of the bony structures. The capsular ligaments were shortened, and his experience was that the late results, some 10–20 years after cessation of treatment, were poor, and that the incidence of osteoarthritis of the hip-joint was very high. The time to start treatment in these children was at the second month of life. Examination then would show nothing more than a shallow acetabulum, but such a joint was mechanically unsound, and without treatment was liable later on to develop osteoarthritis. Possibly these were also the hip-joints most prone to develop Perthes disease and slipped epiphysis. In a considerable number of the children the shallow acetabulum was associated with an adductor spasm and the radiogram showed delay in the ossification of the epiphysis. That delay was a danger sign, and these hips, if untreated, became subluxated. Very few hips were actually dislocated at birth. If seen early enough they showed the changes he had described, and by a form of treatment which combined abduction with function they became normal. Professor Bauer's objection to the Lorenz method was that normal function of the hip-joint was prevented by the fixation, and that therefore there was a repression of the normal development of bones, ligaments and muscles. In all the younger children, under two years, he reduced the dislocation without anæsthesia, using as little violence as possible. During the reduction the child's knee was in the axilla, and the femoral head was lifted forward by a rotatory movement. The reduction sometimes took quite a long time. The fully abducted position was then retained by a brace. In the small babies the brace was a simple affair made of cotton webbing, which went round the shoulders and chest and held the knee. At one year old a stouter brace made of leather was substituted, with an abduction stick running between the legs. Abduction to 90 degrees was usually sufficient at this stage. When the acetabulum was well formed, abduction to 45 degrees was enough and this could be retained by the abduction stick alone. During the whole treatment the children were allowed as much freedom as possible; they kicked about, stood up in their cots, and, later, walked. Hospitalisation was reduced to the minimum, they were easily nursed and bathed and led natural and healthy lives. The bones did not atrophy and the muscles did not waste. Of 86 hips treated by this method he had obtained 85 complete cures. In the older children, first seen when the condition was fully developed, the method gave good results but not so good. Prevention was definitely better than cure. The index in the radiogram of complete reduction was that the femoral epiphysis was seen to lie below the epiphysial line of the acetabulum.

Mr. H. A. T. FAIRBANK criticised the photographs and the films shown by doubting whether abduction was really maintained. The early cases, under one year, he said were never true dislocations but only subluxations. It was not a fair criticism of the Lorenz method to say it was not functional. Mr. Fairbank's own cases had walked from the start. The plaster was heavier, but that was, as far as he saw, its only disadvantage. He agreed that cases reduced after 18 months to 2 years rarely gave a joint so normal that a difference in the X-ray appearance was not detectable to the eye of the trained observer.

Mr. J. C. SCOTT said he had obtained good results by use of an abduction frame and gradual reduction. He controlled his results by arthrograms.

Professor BAUER in reply said that he had personally worked with Lorenz, and treated three hundred cases by his method. Lorenz specifically stated that the hip must be held quite immobile, although he allowed function of the rest of the limb. The result was that the muscles and ligaments did contract.

Closed Plaster Treatment of Wounds

Mr. HIGGS began by recalling that ten years ago he listened with incredulity mixed with horror to Winnett Orr's exposition of his closed-plaster treatment of osteomyelitis before the Royal Society of Medicine. However, Winnett Orr's results were impressive, and the method was soon adopted by orthopædic surgeons, who later expanded its use to the treatment of compound fractures. The fighting in Spain had given ample proof of the value of closed plaster in the treatment of wounds not associated with bone injury. With a vivid recollection of the horrors of wound treatment in the last war, of the

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imperfect immobilisation, the delayed union and non-union, the pain and the toxæmia, one was compelled to the view that the closed-plaster method was a notable advance in the surgical treatment of wounds. His present remarks were based on his experience of 44 consecutive cases almost all of them wounded men from France. The majority had been admitted five days after being wounded, and were still wearing their uniform and their first field dressings, and almost all the wounds were heavily infected. It was too late for wound excision, so the wounds were cleaned, packed with vaseline gauze, and the limbs enclosed in unpadded plaster casts. In only one case was it necessary to remove the plaster prematurely, and that was on account of hæmorrhage from the circumflex artery. The advantages of the method were that it relieved pain and prevented toxæmia; that it stimulated the growth of granulation tissue; that necrosis and sinus formation were exceptional, and bony union rapid; that nerve suture was possible at an earlier date; and that it very much simplified the difficult problem of infected joints. In two cases he felt sure the adoption of this method had saved legs that otherwise would have been amputated. The disadvantages of the method must be recognised, so that they might be overcome. The first was that inexperienced application of plaster might lead to gangrene. He had seen three cases, two in the lower limb and one in the upper limb. It was important never to neglect pain when it was complained of, and always to be sure that there was efficient drainage to the skin. There was also the difficulty in maintaining extension in lower limb fractures; the smell, worse now in the long black-out hours than it had been in the summer; the fact that the wounds remained messy till the plaster was finally discarded; the dermatitis of the surrounding skin; and the poor quality of the skin that covered the wounds when they healed under plaster. Improvement in this last factor might be obtained if skin-grafting was used as soon as the fracture had united. The various agents used to combat the smell had been effective only for a week or two. The deodorising bags they had obtained from Oxford were the best antidote they had yet tried.

Dr. E. T. C. SPOONER reported the results of his bacteriological examination of the pus from the wounds enclosed in plaster. The hæmolytic streptococcus he had found to be the most important infecting organism. There had been no evidence to suggest that the anaerobes were doing any particular harm in the wounds. He warned the meeting that limb wounds treated in plaster were not completely protected from outside infection, and that organisms from the wound found their way to the outside of the plaster and were a potential source of danger to other patients in the ward.

Dr. J. TRUETA said he had been interested to find that Mr. Higgs's experience was the same as his own. Dry gangrene occurred under the plaster and not gas-gangrene. There was one type of bomb used in the Spanish War that did not seem to have been used in this country yet. Its effect was to produce small metal fragments of great penetrative power that broke bones without shattering the muscles. The contractile tone of the muscles was preserved and the fractures presented a problem more like closed fractures. Extension was a difficulty and traction was needed in a few. The closed-plaster method was capable of giving very good results in civilian casualties, but it had not been possible to use it in the front line. To protect the skin from maceration he advised leaving the plaster off for 3–4 days at a time.

Mr. RAINSFORD MOWLEM described the treatment of wounds by early skin-grafting. Two days of continuous local treatment with sulphonamide after granulation had restored the level of wound to the skin edges, followed by a split graft, gave rapid epithelialisation in the cases in which they had tried it. He believed that in something like 75% of cases the wound was healed at the next change of plaster.

Colonel RALPH BROOKE said that in France they had found that the difficulties of transport precluded the use of plaster. They used the Thomas splint for lower limbs and strapped the upper limb to the side. Debridement and flavine dressings had given surprisingly good results. The first dressing was allowed to dry on and only the outer dressings were changed.

Mr. PRIDIE said they had found ultraviolet light to be one of the most potent sterilisers of wounds.

Treatment of Burns

Mr. MOWLEM said that a first principle of treatment must be to avoid all methods in which the immediate results were outweighed by future calamities. He doubted whether it was possible to distinguish clearly between primary and secondary shock, the two conditions might be almost coincident. Delayed shock occurred after 6–8 hours, and the patient was gravely ill, the main cause of the condition being loss of tissue fluid. His impression was that plasma diluted to the normal concentration gave better results than the concentrated plasma. It was of the greatest importance to check the patient's hæmoglobin concentration. The figure of 115–120 meant that the patient was in extreme danger of immediate death. It had been found that a 5% rise required 250 c.cm. plasma to restore it to normal. If, for example, the hæmoglobin percentage was 110, 500 c.cm. must be run in rapidly, and then a slow plasma drip established.

The cause of the toxæmia in burns was not clear, but it was not due to a bacillary septicæmia, for in fatal cases the findings at autopsy were not at all comparable. Three degrees of burns were now recognised. In the first and second, the skin recovered, and the first purpose of treatment—to obtain healing—was not difficult to realise. For these burns, in which there was not complete destruction of the skin, tannic acid, or the dyes, or any combination of these substances, was probably a good treatment, except for the hands. It greatly decreased the difficulties of nursing. The trouble often was to be quite sure on first inspection what was the degree of the burn. Across flexures tannic acid should not be used, because the tan always cracked, and the wound always became septic under it. For third-degree burns, in which there was complete destruction of the skin, tannic acid was not to be used. The tan depended for its separation on epithelial growth beneath it. This did not take place in third-degree burns. The tan had to be removed with the knife and further mutilation was inevitable. Tanning had the further disadvantage of destroying a proportion of the remaining skin cells, and so delayed healing. The skin that was formed under the tan was of a poor quality and more vascular. He did not consider the various dyes any real improvement on tannic acid, and advised that all these serious burns should be treated by complete immersion—whether of patient or of limb—in saline baths. After two immersions the treatment was painless. Four hours a day should be spent in the bath, and the burnt area should then be covered with gauze soaked in saline always kept moist. Granulation was promoted, and the patient could painlessly move the hands through the full range of movement. The disadvantage was that the burns were prone to become rather easily infected, but sulphanilamide had removed a large part of the fear of sepsis. Early skin grafting was proving of great value, especially in burns of the hands. As soon as the surface had granulated level with the skin, powdered sulphanilamide was applied for two days. This temporarily stopped the streptococcal infection. A splitgraft was then applied, with powdered sulphanilamide beneath it. All burnt hands should be primarily treated by saline baths, and secondary grafting if skin loss was extensive. Tannic treatment produced first comfort, then a period of intense pain controlled by morphia, and finally painless fingers in which the circulation had been strangulated.

Sir Henry Dale, M.D., has been elected president of the Royal Society in succession to Sir William Bragg. Other officers of the society are: treasurer, Prof. T. R. Merton, D.Sc.; secretaries, Prof. A. V. Hill, Sc.D., and Prof. A. C. G. Egerton, F.I.C.; foreign secretary, Sir Henry Tizard, F.R.Ae.S.; other members of council, Prof. P. M. S. Blackett, Prof. F. T. Brooks, Mr. C. G. Darwin, Sc.D., Dr. A. N. Drury, Mr. H. J. Gough, D.Sc., Prof. J. B. S. Haldane, Prof. I. M. Heilbron, D.Sc., Prof. O. T. Jones, D.Sc., Prof. R. T. Leiper, M.D., Sir Thomas Middleton, D.Sc., Prof. L. J. Mordell, Mr. C. F. A. Pantin, Sc.D., Prof. H. S. Raper, M.B., Prof. E. K. Rideal, Mr. F. J. W. Roughton, Ph.D.; and Prof. A. M. Tyndall, D.Sc.

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GENERAL MEDICAL COUNCIL

WINTER SESSION, NOV. 26–28, 1940

AT the conclusion of the President's address, reported last week (p. 693), Dr. Daniel Fowler Cappell was introduced by Dr. D. Campbell as representative of the University of St. Andrews. The council then considered one case referred to it by the Dental Board: that of *Herbert Stanley Arnell*, who had been convicted of performing an illegal operation on a woman and sentenced to imprisonment. This name was erased from the Dentists Register. Three names were, after consideration in camera, restored to the Medical Register: *Peter Gerald Stevenson Davis*, *Aymer Douglas Maxwell* and *David Davidson Watson*.

Charges against Medical Practitioners

REPORTED CONVICTIONS

Two adjourned charges arising out of convictions for drunkenness were heard, and the names were not erased. The names of *Crichton Alison* and *James Adolphus Watson-Joe* were erased after convictions for procuring miscarriage and abortion.

An unusual case arising out of the present emergency was that of *Maurice Levy Lucas*, registered as of 44, Blacket Place, Edinburgh, 9, M.B. Edin., 1926, who had been summoned on the charge that he was on July 29, 1940, convicted at the Sheriff Court, Edinburgh, of fraud for obtaining 210 units of motor spirit by pretending to the South East Scotland petroleum officer that he was a medical practitioner and required the petrol for his practice; he had been sentenced to a fine of £15 or 30 days' imprisonment. Respondent was accompanied by Mr. Oswald Hempson, solicitor. Mr. Winterbottom, the council's solicitor, explained that the prosecutor had held that Mr. Lucas was not in practice at all, but occupied in managing a cinema. Mr. Hempson, however, produced before the council letters from patients in support of his contention that he was in fact engaged in practice, feeling that every doctor should hold himself ready in the present emergency, and the council decided not to remove his name.

A passport case, also not resulting in erasure, was that of *Angus Cameron Livingston*, registered as of 1, The Avenue, Bedford Park, Chiswick, London, W.4, L.R.C.P.E., who had been convicted at the Westminster police-court of making a statement known to him to be untrue for the purpose of procuring a passport for Maurice Bloomberg, otherwise Charles Maynard, and had been fined £40 and 10 guineas costs, or 2 months' imprisonment in default. Dr. Livingston attended and apologised.

ERASURE AFTER CONVICTIONS FOR DRUNKENNESS

The case of *Andrew Thornton*, registered as of c/o 38, Queen's Court, Bayswater, London, W.2, M.B. St. And., 1928, who had been summoned to appear before the council on the following charge:—

That you were convicted of the following misdemeanours, viz.: (1) On Sept. 11, 1937, at the City of Liverpool police-court, of being drunk and incapable, and were fined 10*s.*; (2) On Nov. 8, 1937, at the City of Liverpool police-court, of being drunk and incapable, and were fined £1 or 10 days' imprisonment in default; (3) On March 11, 1940, at the Marylebone police-court: (*a*) Of being drunk and disorderly (date of offence March 8, 1940), and were sentenced to 14 days' hard labour; (*b*) Of being drunk (date of offence March 9, 1940), and were fined 10*s.* and £1 2*s.* 6*d.* costs, or 7 days' imprisonment in default; (*c*) Of wilfully damaging a screen value £2 5*s.*, the property of the Receiver for Metropolitan Police (date of offence March 9, 1940), and were fined £1 and £2 5*s.* 0*d.*, or 14 days' imprisonment in default; and (4) On July 23, 1940, at the Marylebone police-court: (*a*) Of being drunk and disorderly (date of offence July 23, 1940); (*b*) Of assaulting William Walters, a constable of the Metropolitan Police, whilst in the execution of his duty (date of offence July 23, 1940), and were sentenced to one month's imprisonment with hard labour.

Mr. Thornton attended, accompanied by Mr. A. A. Pereira, counsel, instructed by Messrs. Le Brasseur and Oakley, on behalf of the London and Counties Medical Protection Society. Mr. Winterbottom laid the facts before the council, and Mr. Pereira addressed it on behalf of Mr. Thornton and called him as a witness. He expressed his profound regret and gave assurances as to his future conduct, but the council directed the registrar to remove his name.

DRUNKENNESS WITHOUT POLICE-COURT CONVICTION

The case of *Henry McNeill*, registered as of 2, Cedarne Road, London, S.W.6, M.B. Belf., 1920, who had been summoned to appear before the council on the following charge:—

That, being a registered medical practitioner, on Aug. 26 and 27, 1940, you were so far under the influence of drink that you were incapable of properly carrying out your professional duties towards your patients who were waiting to consult you at your surgery, 108, Pitfield Street, Hoxton, N.1, between the hours of 6 P.M. and 7 P.M. And that in relation thereto you have been guilty of infamous conduct in a professional respect.

Corroborative evidence was submitted to the council by two patients. Mr. Hempson characterised the case as a pathetic one. Respondent had had a hard struggle with poverty all his life; last August his wife had been suffering from sarcoma and he himself had been sickening for scarlet fever, for which he had been admitted to hospital on Sept. 4. He knew very little of the incidents of those days and frankly admitted that he had been under the influence of drink, to which he had resorted in his misery. He had at that time been sleeping in the surgery, which had been boarded up as a refuge room; it was, therefore, much as if the patient had walked uninvited into his bedroom. He had not proposed to hold a surgery at all that night, having arranged with a colleague to see his patients. Since entering hospital he had abstained altogether from alcohol, and gave a solemn undertaking to do so in future. Judgment was postponed for one year, subject to the usual provisos.

ERASURES FOR ADULTERY

The case of *Martin Herholdt Jacobs*, registered as of 184, Old Street, London, E.C.1, M.R.C.S., 1924, who had been summoned to appear on the following charge:—

That, being a registered medical practitioner: (1) You committed adultery with Gladys Ethel Ivereigh, a married woman, of which adultery you were found guilty by the decree of the Probate, Divorce and Admiralty Division (Divorce) of the High Court of Justice dated Oct. 11, 1939, and made absolute on Feb. 26, 1940, in the case of Jacobs, E. V. v. Jacobs, M. H., in which you were the respondent. (2) You stood in professional relationship with the said Gladys Ethel Ivereigh and/or her family from about the beginning of 1934 until November, 1934. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

Mr. Jacobs was not present, nor was he represented. Mr. Winterbottom said that the respondent had written from South Africa saying that he could not attend, and that the husband could not obtain leave from his duties. There was therefore no oral evidence. The statutory declarations conflicted slightly over the dates when the respondent had first met Mrs. Ivereigh. There was no dispute that the doctor had attended Mr. and Mrs. Ivereigh's two children, but the doctor said that he had met Mrs. Ivereigh some time before. He agreed that he had seen her little son in 1927, but thereafter had not seen the mother for several months. In 1934 his wife had left him, sooner than become a mother, and he had sold his practice and gone to South Africa. He declared that Mrs. Ivereigh had never been a patient of his. The council directed the registrar to erase his name from the register.

The case of *Bernard Drummond Hendy*, registered as of 8, Kidderpore Avenue, London, N.W.3, M.R.C.S., 1923, M.B. Camb., 1925, who had been summoned to appear before the council on the following charge:—

That being a registered medical practitioner you abused your position by behaving improperly to, and committing adultery with, Mrs. Violet Stacey, who was a patient of yours, on numerous occasions between October, 1936, and June, 1940. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

The complainants were Mr. and Mrs. H. C. Stacey, who were represented by Mr. T. F. J. Hobley, counsel, instructed by Messrs. Bulcraig and Davis, solicitors.

Mr. Hobley and Dr. Hendy asked that the case might be heard in camera, but the request was not acceded to.

Mr. Hobley said that adultery in 1939 and 1940 was admitted. Mrs. Stacey had gone to respondent for psychological treatment in 1936 and the professional relationship had continued at least until 1939 or longer. In that year the Staceys had moved to Gerrards Cross on account of their child's ill health. Affectionate letters written in July and August would be put in evidence. Dr. Hendy claimed that he had made it clear in March, 1939, that the professional relationship ended. A letter of Oct. 4, 1939, said, "About the 'patient' problem, that got so knotty that I solved it in my own mind by thinking of you as a friend solely. Perhaps that is *not* the right answer after all." Intimacies short of intercourse had taken place well within the time when the doctor himself admitted professional relationship.

Mrs. Violet Stacey testified to her statutory declaration in which she stated that treatment had begun in October, 1936, and early in 1937 the doctor had shown great affection for her and desire for physical intimacies. She had suggested going to another doctor, but he had shown great distress and begged her not to. They had discussed at length his intimate relationships with Miss G., another patient, and his difficulties with women. Knowing that she would not continue treatment if he persisted, Dr. Hendy promised to control himself. She had interviewed Miss G. who had advised her to give up the treatment. Dr. Hendy had written to and visited her at Gerrards Cross as a friend in 1939–40 and on nearly all occasions intercourse had taken place. He had mentioned his intimacies with Mrs. B., another patient, and they had quarrelled over this, and over a friendship with another patient. Intimacies had taken place in the consulting-room from February, 1937: at first the doctor had held her hand and touched her; adultery had first occurred in October, 1939. Her son had become seriously ill in March of that year. Her husband had been on A.R.P. duties from September, 1939, and away on certain nights, and on those nights intercourse had taken place. She had returned from Gerrards Cross in June, 1939. She identified a number of affectionate letters written in 1938 and 1939. In June, 1940, respondent had written asking for release from all contacts and intimacies associated with friendship, and asking for full mutual forgiveness. After this letter witness had talked to her husband and he to the doctor.

Dr. Hendy, cross-examining, suggested that the "intimacies" and "confidences" described by witness were made in an attempt to draw her out and help her; this she denied. She maintained that his feeling for women was abnormal. She admitted that she had seen Miss G. at his suggestion. She declared that he had spoken to her of many patients becoming friends and had debated whether, if he loved a woman enough, he should have intercourse with her. She denied having confessed, early in her treatment, that she was in love with him; they had acknowledged a mutual affection. She maintained that he had continuously asked for her friendship and love.

In reply to the President, Dr. Hendy said he admitted adultery but denied professional relationship at the time and maintained that his attitude during the professional relationship had not been improper.

Mr. Harold Charles Stacey, examined by Mr. Hobley, testified that he had interviewed Dr. Hendy on June 4, 1940. The doctor had said he was very sorry that things had turned out as they had and that he had been uncomfortable about them for some time. He had made no denial, and they had discussed the doctor's adultery with another married patient, the doctor saying that the husband knew. He confirmed the story of professional relationship already told. He had paid Dr. Hendy's bills monthly from November, 1936, to May 1, 1939. At the time of the boy's illness Dr. Hendy had talked to him of future treatment; he had thought at the time that the treatment had just lapsed because of the residence in Bucks.

A statutory declaration by Miss G. described Mrs. Stacey as very ill-balanced and hysterical and very much in love with Dr. Hendy. Miss G. had warned him against Mrs. Stacey as a dangerous woman. His behaviour during her own treatment had always been perfectly correct.

Dr. Hendy, addressing the council, admitted that the course of treatment he had taken with Mrs. Stacey was an utterly mistaken and dangerous one, but he had believed at the time that it was in her best interests. He had gone against the precepts of the strict psychoanalytical school for reasons he had thought good at the time. Cross-examined by Mr. Hobley, he said he had come to the conclusion that she was a dangerous woman about July or August, 1939, but had gone on writing affectionate letters throughout the autumn and had first committed adultery with her in October. He had failed to find the will to break from her until August, 1940. He claimed that there had been no professional relationship after May, 1939, the date of the last receipt. She had appealed to him for help when her son died in the late autumn of 1939 and he had done all he could for her in a friendly and psychological way.

In reply to questions by the President and legal assessor, Dr. Hendy could give no evidence for the breaking-off of professional relationship; it had been done verbally. He agreed that he had been charging the husband for professional services at a time when unwise and improper intimacies (short of adultery) had been taking place.

After a brief consideration in camera, the President announced that the council had found the charges proved and had directed the registrar to erase Dr. Hendy's name from the register.

The Pharmacopœia

Sir Farquhar Buzzard, chairman of the pharmacopœia committee, reported that the second addendum to the B.P. 1932 had been published and gazetted on June 14. Amendments designed to adapt certain monographs to the conditions of war-time were made official on July 5. He recalled that at the last session the preparation of a third addendum had been reported, to include monographs on certain substances not formerly made in this country but now being or likely to be produced by British manufacturers, in some instances under licence from the controller-general of patents. Most of these monographs were now complete, but some were awaiting the conclusion of experiments necessary for the definition of biological tests by methods of sterilisation. The available monographs had been collected and the third addendum was now ready for press. The need for a fourth addendum might be accentuated at any time by the necessity for adapting the official pharmacopœial formulæ to meet the present conditions which affect the supplies of glycerin, sugar and similar substances. A subcommittee of the Pharmacopœia Commission is studying substitutes for glycerin and sugar. The next pharmacopœia is due in 1941.

Students Register

Colonel H. L. Tidy, chairman of the education committee, said that the publication of the register of medical and dental students would be suspended during the present emergency. A list compiled from the returns received from school authorities will be available for reference in the G.M.C. office, and it is hoped that they will continue to make returns in order that the annual compilation may not be interrupted. The register for 1939–40, compiled but not printed, contains the names of 2535 medical students and 317 dental students admitted during the academical year.

THIRD ADDENDUM TO THE B.P.—The third addendum to the British Pharmacopœia 1932, to which Sir Farquhar Buzzard referred at the session of the General Medical Council reported above, will become official on Jan. 1, 1941. The new monographs deal with a number of British equivalents of foreign drugs, including bromethol (Avertin), carbachol (Doryl), soluble hexobarbitone (Evipan Sodium), iodoxylum (Uroselectan-B), leptazol (Cardiazol), mepacrine hydrochloride (Atebrin), niketha-mide (Coramine), phemitone (Prominal), and stibophen (Fouadin). The addendum will also make official a tannic-acid jelly containing 50 g. of tannic acid per litre under the name pasta acidi tannici, vitamin B_1 as aneurine hydrochloride, and parachlorometacresol as chlorocresol.

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THE LANCET

LONDON: SATURDAY, DECEMBER 7, 1940

MILK AND FRUIT

Lord WOOLTON is reducing the householder's milk by 10% during the next two months, and has told us to wish a temporary goodbye to imported apples, apricots, grapes and bananas. "On the best scientific advice," too, he has decided to stop the import of nearly all canned fruits and all fresh fruit except oranges, which will be available in meagre supply. The position in regard to milk is not serious. Production is down by 14% compared with last year but the consumption of milk as milk is up by 18%, thanks to the free and cheap supply to nursing mothers and children under five. Doctors will not quarrel with the decision to cut down the adult's consumption to meet this demand, and indeed most of us would be willing to stint the adult still further if the milk scheme could be extended to all children and adolescents. For it is in adolescence that the need for the calcium of milk is at its highest. The adult can get on quite well with first-class protein from other sources. All the same, we need our milk more now that cheese is short, and the Government will no doubt encourage farmers to increase their output.

We all appreciate the need for saving shipping-space, and little can be said in defence of most of the imported fresh fruits. The orange, with its friend the grape-fruit which we hope will also be excluded from the ban, is much the most valuable of them. Dietetically the apple has little to recommend it. Apricots contain 3000 units of vitamin A (a day's ration) per 100 g. (3½ oz.), but none of us rely on them for our vitamin-A intake. Grapes have no value apart from 16% of available carbohydrate, which can be obtained in smaller bulk elsewhere. Only the banana can make out a good case for its space in the hold. The vitamin-C content of the West Indian variety has been estimated as 7 mg. (140 I.U.) per 100 g.,[1] but newer methods of estimation have put it at 12–15 mg. or 240–300 I.U. Two bananas would thus represent a useful contribution to the daily ration of vitamin C. Moreover the banana contains 19·2% of easily available carbohydrate, which puts it at the head of the fresh fruits for calorie value. Its popularity with poor people, who eat so little fruit, should also be an argument for lifting the embargo as soon as possible. We have as yet been given no clue as to what Lord WOOLTON has in mind about canned fruits. Apricots, peaches, pears, pine-apples, grape-fruit, mandarins and tomatoes all retain part of their vitamin C after canning, but we do not ordinarily eat enough of them to miss them much except possibly those with a high vitamin-C content like grape-fruit and tomatoes. Loganberries, raspberries, blackcurrants, plums and strawberries were canned in England this year, and probably in amounts sufficient to see us through till next season. In one sense all fresh fruits are a wasteful cargo, for much of their weight is peel and of the remainder at least three-quarters is water; and tinned fruits are open to much the same criticism.

1. *Lancet*, Aug. 17, 1940, p. 190.

CHEMOTHERAPY IN OTITIS MEDIA AND MASTOIDITIS

OTITIS MEDIA does not seem to be the disease it was—it seems to be clearing up quicker and its complications are not so common. This has been so since the sulphonamides were loosed on it, but it does not necessarily follow that chemotherapy is responsible. Streptococcal and to a less extent pneumococcal infection of the upper respiratory tract is often secondary to influenza or one of the zymotic diseases, and it is in the severe epidemics of these ailments, when resistance is low, that the most troublesome cases of otitis are met with. Moreover, the virulence of secondary invaders varies and may be increased by passage. Some complicated and usually unobtainable data would therefore have to be produced before definite conclusions could be drawn from the study of any form of therapy over a short period. No such unimpeachable evidence of the efficacy of chemotherapy has yet appeared, and it happens that the three years during which the sulphonamides have been in common use have not witnessed any widespread epidemic of a sort likely to be accompanied by severe secondary streptococcal infection.

BOWERS [1] has analysed 793 cases of acute suppurative otitis media treated in New York during the last three years, of which about equal numbers were adults and children. In 231 early cases myringotomy was performed on or shortly after admission to hospital and the patients were kept in until the discharge ceased. Chemotherapy was used in 113 of them and not in the remaining 118. On an average otorrhœa lasted for nine days in the chemotherapy group and seventeen days in the others. Again, 387 cases were selected where the ear condition was only of a few days' duration on admission; 207 of these received chemotherapy and 12 (5·8%) of them progressed to mastoiditis, compared with 24 (13·3%) of the remaining 180 cases which did not receive chemotherapy. BOWERS gives a chart of the number of mastoidectomies performed at his hospital since 1929, with a rapid falling off since the introduction of chemotherapy. HORAN and FRENCH [2] report results in lads at the naval hospitals at Chatham and Shotley which are even more striking. Of 607 cases of acute otitis media treated from 1934 to the middle of 1937 without chemotherapy 138 (22·7%) developed mastoiditis, whereas of 621 cases treated by chemotherapy from mid 1937 to the end of 1939 only 21 (3·4%) developed mastoiditis. Moreover, there were 11 deaths from the complications of acute otitis media in the 3½ years before chemotherapy was introduced and there have been none since.

The drug must be given early and in full doses, and must be continued for some days after the disappearance of symptoms (a week according to BOWERS). Since the majority of cases are due to a hæmolytic streptococcus sulphanilamide is the drug of choice. If a culture of the aural discharge (or from the nasopharynx if there is no otorrhœa) yields some other organism—usually a pneumococcus or staphylococcus—sulphapyridine or sulphathiazole should be substituted. Sulphapyridine is often used as a routine because it acts on both streptococci and pneumococci,

1. Bowers, W. C. *J. Amer. med. Ass.* July 20, 1940, p. 178.
2. Horan, V. G. and French, S. G. *Lancet*, 1940, 1, 680.

but it is more toxic and more likely to cause gastric and other upsets than sulphanilamide. HORAN and FRENCH found they could give large doses of sulphanilamide to outpatients (who were, however, under supervision in barracks) without encountering alarming toxic symptoms. Regular white-cell counts were done and if the figure fell below 5000 the drug was stopped and pentnucleotide given. But in their patients nausea and vomiting were common, and BOWERS takes the opposite stand of complete rest in bed, daily full blood-counts and repeated urine analysis. Safety with convenience can be attained somewhere between these two extremes. Most patients will certainly prefer to be in bed when receiving full doses of any of these drugs, and the blood should be examined at the outset and every three or four days until a week after the drug is discontinued.

BOWERS, HORAN, and FRENCH, and also LILLIE,[3] point out that chemotherapy may mask the onset of mastoiditis, but this need not be a danger if the possibility is remembered and the apparent well-being of the patient is carefully balanced against the local signs and symptoms. BOWERS quotes instances where the disease was cured in the soft and vascular tissues of the middle ear while it continued in the mastoid cells. The meatal discharge ceased and the drum healed, but exploration of the mastoid revealed bone necrosis and pus. In one of these cases there was an apparently normal radiogram. Thus where there is any doubt it is better to operate, but operation can now be delayed to a degree previously unthinkable provided the patient is under observation. Such an expectant attitude does not result in complications, for these are extremely rare when chemotherapy is begun early and is sufficiently intensive. When complications such as petrositis, lateral-sinus thrombosis, meningitis or labyrinthitis are already present massive doses of sulphanilamide must be continued after operative removal of the focus, but in uncomplicated mastoiditis BOWERS believes that chemotherapy is ineffectual and may only confuse the clinical picture, and he therefore stops the drug immediately after operation.

Even allowing for variations in clinical material and circumstances and in the virulence of the attacking micro-organisms the evidence is unmistakable that in the acute ear diseases chemotherapy is a powerful weapon, and as such must be handled boldly, though with an eye to the possible risks. It is only regrettable that none of the drugs is of the slightest use in chronic aural suppuration, for here the blood-supply is poor as a result of fibrosis, necrosis of bone has already taken place, and natural removal of the dead bone detritus is impossible.

SHELTER LEGS

SWOLLEN legs began to appear in doctors' consulting-rooms within a few weeks of the start of the bombardment of London. The condition may begin as simple œdema but later the skin becomes stretched, shiny red, and painful. The appearance suggests an early cellulitis, but there seems to be no primary infection, though bullæ and superficial ulcers may appear later. Thrombophlebitis may also develop, and should always be suspected where one leg is more swollen and painful than the other. Elderly women seem to be most commonly affected, but cases also occur in men and young people. Deck chairs are suspected as a likely cause of the trouble; they are used freely in the shelters, and the wooden cross-bar causes pressure on the back of the thigh or on the popliteal vessels. Patients sometimes complain of swollen ankles after long sea voyages when much of the time has been spent in deck chairs, and the condition has been seen in people flying home from Cape Town; the aeroplane seats are rather low and of a similar pattern to a deck chair. It seems that the circulation cannot be maintained against gravity unless there is a rest period at intervals. The œdema and reddening of the skin clear up at once if the patient is put at rest in bed, but such complications as ulceration and thrombosis naturally require prolonged treatment. The elderly and obese are loth to make use of bunks in the shelters even where they are provided, and since they are apt to sit about all day as well as all night they readily acquire shelter leg. Doctors can only hope to prevent this ailment by constantly impressing on their older and heavier patients that they must get their feet up for several hours out of the twenty-four—if not at night, then during the day.

HYPERIMMUNE SERUM FOR VIRUS DISEASES

ONE of the ways in which the body defends itself against the attack of parasites is by the formation of antibodies. Since this is nature's method of cure it has been natural to attempt to use antibodies both in the prophylaxis and treatment of disease. In the case of certain bacterial infections, notably diphtheria, tetanus and gas gangrene, the value of these antisera has long been recognised; in virus infections, although they give rise to highly specific immune bodies, the value of viricidal sera has not been so evident. This is usually put down to the fact that viruses, being intracellular parasites, cannot be killed by means of antisera once they have got safely into the cells. Yellow-fever virus in man, for instance, gives rise to immune bodies within three days of the onset of fever but despite the presence of these immune bodies the patient is only too liable to die during the next three or four days, the fatal damage having been inflicted before the development of immune bodies. Theoretically, however, in certain circumstances, antisera might be of value in the incubation period and even during the early stages of an infection. Only a few viruses—those of warts and molluscum contagiosum for instance—exert their pathogenic action on the tissues at their portal of entry; all the others have to travel by the blood, lymphatics or nerves to reach their target area. If the susceptible cells can be protected by a barrage of immune bodies then the virus cannot injure them. The time factor thus becomes of importance. If the time taken by the virus to travel from its portal of entry to its seat of activity is short the immune bodies will not have time to reach and protect the cells; if the time is very long the protection afforded by the immune bodies will have worn off owing to the excretion of the foreign proteins. The same thing may occur if the immune serum is given as a prophylactic before the virus has actually entered the tissues. In some cases, however, the virus may only arrive in sufficient concentration to infect at first a very few cells; immune serum may

3. Lillie, H. I. *J. Amer. med. Ass.* Aug. 17, 1940, p. 506.

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then serve to protect the greater number of susceptible cells and the patient as a result suffers only from a mild or symptomless attack. It is thus obvious that the virus diseases in which immune bodies can be used prophylactically or curatively with success are limited to those in which either the incubation period is not too long or too short, or a massive and simultaneous infection of the susceptible cells does not occur. In measles there is now considerable evidence that convalescent serum, placental globulins or even pooled adult sera given during the incubation period either inhibit or at least modify the disease; there is even some support for the suggestion that serum given after the beginning of catarrhal symptoms will reduce the severity of the infection. In poliomyelitis there is still acute controversy as to whether immune serum given during the febrile period has any influence in preventing the onset of paralysis.

Indirect evidence on this question has been brought forward by ZICHIS and SHAUGHNESSY.[1] Using a hyperimmune serum prepared in rabbits against the western strain of equine encephalomyelitis, they were successful in protecting mice forty-eight hours after infection of the virus, while guineapigs were successfully treated after the appearance of the first sign of the disease. About two-thirds of the guineapigs given the serum immediately after the onset of fever recovered, and when they were killed two to four weeks after recovery histological examination showed that the well-marked inflammatory changes in the central nervous system were receding. A commercial serum produced by immunisation of horses but with an immune-body titre only about one-thousandth that of the rabbit serum entirely failed to protect either guineapigs or mice. For success it is evidently essential to use a serum with a very high immune-body titre, but the results show that provided such a serum is employed it is possible to halt the progress of an infective condition of the central nervous system in laboratory animals. The application of the results of these experiments to man is still uncertain since the doses used in mice and guineapigs were large. Thus for a mouse, presumably weighing about 20 g., the dose was 1 c.cm.; for an average man weighing 70 kg. this would correspond to a dose of 3·5 litres of hyperimmune rabbit-serum.

SIR HENRY DALE, P.R.S.

AFTER serving as secretary of the Royal Society 1925–35 Sir Henry Dale has been unanimously elected president. This will be an encouragement to those who like to see the Royal Society in close touch with human needs. The last war, with E. H. Starling as its agent, linked physiology to the nutrition of the people. May we not now hope that the nature and purpose of remedies will be made clear to us and the Phil. Trans. become the book of human experience? Moreover Sir Henry Dale will preside over the council which advises the Government on scientific matters.

Lieut.-Colonel G. S. PARKINSON, D.S.O., R.A.M.C. (retd.), is acting as dean of the London School of Hygiene and Tropical Medicine and directing the department of public health there since Sir Wilson Jameson's translation to the Ministry of Health.

1. Zichis, J. and Shaughnessy, H. J. *J. Amer. med. Ass.* 1940, **115**, 1071.

Annotations

MECHANISM OF CAPILLARY CONTRACTION

THE importance of the Rouget cell rests chiefly on the claim that it provides an anatomical basis for contraction in capillaries. These endothelial tubes are known to open and close their lumens independent of the activity of arterioles and venules, provided the tone of the capillary endothelium is high. Capillaries are provided with sympathetic nerves whose stimulation brings about closure of the lumen even when the arterial supply to them has just previously been completely obstructed. Through what intermediary do the effective nervous or chemical and physical impulses act? For about half a century certain fibrillar contractile adventitial cells, described by Rouget, have been credited with the ability to bring about this closure. A number of experimental observations made it doubtful that Rouget cells take the place of muscle-fibres, and Zweifach[1] by actual micromanipulation showed that when prodded with a needle the Rouget cell may become round and move away from the capillary, but that this movement does not cause any alteration in the capillary lumen. He also noted that stimulation of the capillary endothelium itself with micro-needles was followed by changes in capillary diameter. The exact means by which this change in diameter was brought about was left unsolved. By means of a still more refined technique Sanders, Ebert and Florey,[2] appear to have answered this question. They designed a special Sandison-Clark chamber for insertion in the rabbit's ear, which allows optimal illumination and optical arrangements for their observations. After the growth of capillaries into this chamber the peripheral end of the cervical sympathetic was stimulated faradically. After a latent period of 5–7 seconds the capillary lumen was closed. This happened through swelling of endothelial nuclei. These nuclei bulged gradually into and thus closed or narrowed the lumen, so that only greatly deformed red corpuscles could be squeezed through. Subsequent opening was accompanied by reduction in the nuclear swelling. No movement of the Rouget cells was seen during stimulation. The microphotographs which Florey and his colleagues have taken are convincing, and, for those who must see the phenomenon in action before they believe it, they have provided a cinema film in colour.

STRESS INCONTINENCE

THE involuntary passage of a small amount of urine accompanying a sudden rise of intra-abdominal pressure from whatever cause, be it a cough, a laugh, a sneeze or the lifting of a weight, is an extremely distressing disability. Only women are affected and the exact morbid anatomy of the condition is as yet undecided, largely because few anatomists are agreed as to what is the sphincter of the female urethra. There are two structures described: the external sphincter under voluntary control, lying between the layers of the triangular ligament with the deep transverse perineal muscles; and an ill-defined muscle bundle at the proximal end of the urethra, lying above the superior or deep layer of the triangular ligament, which has been described as an involuntary or reflex sphincter. This proximal sphincter relaxes when the detrusor fibres of the bladder come into play, thus following the behaviour of all sphincters in hollow viscera. Allan Barnes[3] has made some observations on the behaviour of the urethra and its sphincters in cases of stress incontinence before and after operation. He used radiography and concluded that the urethral sphincters are two—an internal and involuntary sphincter, which

1. Zweifach, B. W. *Anat. Rec.* 1934, **59**, 83.
2. Sanders, A. G., Ebert, R. H. and Florey, H. W. *Quar. J. exp. Physiol.* 1940, **30**, 281.
3. *Amer. J. Obstet. Gynec.* September, 1940, p. 381.

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exerts a contractile force in direct proportion to the pressure of fluid in the bladder, and an external sphincter under voluntary control. By using radio-opaque sodium iodide in the bladder and taking direct manometric readings Barnes established that a given volume of fluid in the normal bladder results in a smaller intracystic pressure than exactly the same volume does in the bladder of a woman suffering from uterine prolapse. This simply means that the prolapsed bladder makes a greater demand on the internal sphincter than the normal bladder so that a cough or sneeze may provide the threshold pressure for incontinence, the external sphincter alone being unable to dam back the rising tide. By inserting a finger-shaped balloon into the urethra and filling it with sodium iodide Barnes demonstrated that the normal urethra is able to tolerate pressures up to 35 c.cm. of water and remain closed throughout its whole length, right up to the urethrovesical junction. Funneling of the upper end of the urethra indicates partial weakness of the internal sphincter and is a constant finding in many cases of stress incontinence. If the patient is asked to strain while the balloon is in position and the bladder partially filled intravesical pressures up to 80 c.cm. of water may be obtained. Even this increased pressure is unable to cause funneling of the urethrovesical junction if the internal sphincter is intact. Thus it seems that the internal sphincter is by far the more important of the two in preserving urinary continence.

SPLEEN EXTRACTS IN CANCER THERAPY

AN idea is widely held that certain tissues are antiblastic—that they, or their extracts, specifically inhibit the growth of tumour cells. The spleen especially enjoys a reputation as an antiblastic organ because macroscopic metastases of the spleen are rare. Microscopic deposits are often found in it however, as Kettle and others have shown.[1] These deposits are probably pumped out of its relatively wide sinusoids into the splenic vein before they are able to gain a hold by infiltrating the spleen itself. In fact the comparative freedom of this organ from secondary growths probably has a physiological and anatomical rather than a humoral basis. Nevertheless the number of experiments in which spleen extract is used as a therapeutic antiblastic agent continually grow. Extract of spleen, if injected into an animal will act as an antigen provoking antibodies to foreign cells of any kind that may subsequently be inoculated. Thus if the efficacy of extract is tested against the growth of transplanted tumours it becomes impossible to assess any purely antiblastic capacities which may have been conveyed by it to the injected animal. The only test in which an assessment of specific anti-tumour-growth properties can be made must be planned on spontaneous primary tumours. This necessity has been seen by Lewisohn, Leuchtenberger and Laszlo who report[2] some encouraging results.

The spleens used by Lewisohn and his colleagues came from mice which had received previous injections and transplants. The injections were highly concentrated extracts of beef spleen; the transplants were cells of mouse sarcoma 180. As was to be expected, some of these transplants regressed when the extracts provoked sufficient foreign-cell antibody to deal with them. The mice in which these expected regressions occurred were then made the source of the spleen extract used in the next test. The test of specific antiblastic action was made on spontaneous mammary carcinomas in a strain of mice in which natural regressions have never been observed. Among the tumour-bearing mice treated some growths regressed and disappeared. The final results are recorded in a footnote made 7½ months after the first treated tumour disappeared and about 4 months after the last. Of 83 mice, 17 were apparently cured; of these 17 only 4 had remained free of macroscopic signs of a tumour for 7 months. Recurrences had occurred recently in 8 mice which were classed as cured at the time of presentation of the paper and before the footnote was added. A longer period of observation and a larger number of animals successfully treated will be required before any great hopes can be raised by a method based on such a dubious theory.

1. Kettle, E. H. *J. Path. Bact.* 1912, **17**, 40.
2. Lewisohn, R., Leuchtenberger, R. and Laszlo, D. *Surg. Gynec. Obstet.* September, 1940, p. 274.

FŒTAL HÆMORRHAGE

IT is generally believed that hæmorrhagic disease of the newborn develops between the second and sixth days after birth but Javert[1] has obtained evidence of its onset during the first day in over a third of a series of cases. He calls attention to the higher incidence of antepartum complications in the mothers of these infants and finds the condition to be associated either with prolonged labour or with excessively violent uterine contractions. He reports[2] three cases of neonatal hæmorrhage which began in utero, in which the mothers had a severe labour of short duration. In two the amniotic fluid was blood-stained, and in the third there were placental hæmatomas. While it may be true, as Javert suggests, that uterine contractions increase the infant's intracapillary pressure and so tend to produce hæmorrhage, it is surely going too far to conclude that neonatal hæmorrhages may be regarded as physiological, becoming pathological only when the clotting mechanism is disturbed. Javert draws attention to his finding of a prothrombin level of 13% in one infant while that of the mother was normal, and this he regards as evidence in support of his idea. He also suggests that a low prothrombin level in the infant may be a factor in producing premature separation of the placenta, and supports Shettles, Delfs and Hellman[3] in advocating the administration of vitamin K to mothers during the last month of pregnancy to lower the incidence of neonatal hæmorrhage. On the basis of a single case he maintains that there is a reduction in the infant's prothrombin level when the mother has received antisyphilitic therapy. In this connexion it may be recalled that Horne and Scarborough[4] found an increased capillary fragility to be associated with intolerance to antisyphilitic treatment, and increased capillary fragility in an infant would presumably contribute to the production of hæmorrhage.

MACULAR DYSTROPHY

CONDITIONS like Doyne's choroiditis, Best's disease, Stargardt's disease, familial macular degeneration and various nondescript varieties of familial or hereditary macular affections float like disembodied ghosts in the literature on fundus lesions. That these affections are all different aspects of a distinct clinical entity is suggested by Arnold Sorsby[5] in an extensive survey of the literature, supported by eight personally observed familial groups. On the basis of his own cases he holds that while the basic form of the affection consists of mottling of the maculæ many families show considerable departure from the basic type, while all sorts of gradations occur between the two extremes. It is true that a familial stamp characterises the affection, different members of the same family often showing strong resemblances in their lesions; but well-marked variations are also present within some families. The duration of the affection is probably largely responsible for the differences in aspect in different members of a family, so that we should be careful to recognise intermediate

1. Javert, C. T. *Amer. J. Obstet. Gynec.* 1938, **35**, 200.
2. Javert, *Ibid*, September 1940, p. 453.
3. Shettles, L., Delfs, E. and Hellman, L. M. *Bull. Johns. Hopk. Hosp.* 1939, **65**, 419.
4. Horne, G. O. and Scarborough, H. *Lancet*, July 20, 1940, p. 66.
5. *Brit. J. Ophthal.* 1940, **24**, 469.

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stages as such and not as atypical variants. Two of the families Sorsby describes showed exudative reactions in the central area of the fund—a clear approach to the patterned exudative reaction of Doyne's choroiditis. That these are variants of the classical type is seen from the fact that in one of the families a member showed not the exudative reaction but the basic reaction of mottling. Massive pigmentary changes at the maculæ extending towards the periphery were observed in another family. The range of appearances is extensive, simulating retinitis, choroiditis, hole formation at the macula and even retinitis pigmentosa; and Sorsby's own evidence that all these appearances constitute one clinical group is supported by numerous isolated observations by other observers. The earlier attempt by Behr to systematise these affections he regards as too schematic, since it introduced artificial age-limits. Sorsby finds that the affection may develop at any age, making its appearance at the one extreme as a neonatal condition, and at the other as a senile macular degeneration.

Macular dystrophy may be so severe as to lead to total day blindness or so mild that vision is hardly affected. The condition is not of necessity rapidly and relentlessly progressive, as older observers believed. In its wide range of age-distribution and severity it offers a close parallel to retinitis pigmentosa. A further parallel lies in the genetic behaviour. Like retinitis pigmentosa, macular dystrophy has more than one mode of inheritance; it can be dominant or recessive and perhaps also partially sex-linked.

LIFE-CYCLE OF THE VACCINIA VIRUS

WHEN viruses were first investigated they were regarded as simple entities which multiplied only by fission. Further study of those viruses that are just large enough to be within the range of the most powerful microscopes has produced evidence that at least some of them go through a life-cycle more reminiscent of protozoa than of bacteria. The original demonstration by Bedson and Bland [1] of a developmental cycle in the psittacosis virus has been followed by similar findings with the viruses of trachoma, inclusion conjunctivitis and lymphogranuloma venereum. In 1939 Bland and Robinow [2] showed that vaccinia virus also had a developmental cycle, since in the epithelial cells of the rabbit's cornea grown in vitro the virus underwent a progressive and obligatory process of development. Closely similar findings have now been reported by Eisenberg-Merling,[3] using a technique by means of which it has been possible to examine the growth of the virus in the cells of the rabbit's cornea if necessary for weeks at a time. The appearances are described as being of three types, although since there is considerable overlapping this classification is more or less artificial. In type 1 the virus lives for only a short time; in type 2 the life-cycle is repeated several times and colonies having the appearance of cell-extrusions are formed but do not persist; type 3 shows repeated reproduction and multiplication in the form of what are assumed to be real cultures with a multitude of colonies, made up of cell-extrusions and cysts, and an enormous number of resulting individual virus bodies comparable to the numbers seen in bacterial cultures. It seems evident from these experiments that although the host cells die within a few days of their removal from the rabbit the virus is able to go on living for a much longer period, presumably because the necessary cell products are set free in sufficient amount. In other words, since inoculation of animals with material from specimens where the cells are dead and destroyed gives positive results, it is probable that vaccinia virus can multiply when dead cells or cell debris represent the source of energy.

Very similar conclusions have been reached by Findlay and MacCallum [4] working with a different technique on the virus of yellow fever. This virus was found to multiply in a medium consisting simply of Tyrode solution without glucose, provided that a small amount of chick-embryo tissue was also present. Since the Tyrode solution contained only inorganic salts there was no source of energy for the maintenance of cell metabolism, which must have been proceeding extraordinarily slowly if as is more probable it had not entirely ceased. Since the yellow-fever virus is unable to initiate growth in the absence of living cells, even when provided with a complete amino-acid mixture, it is possible that the rôle of the cells is to provide an essential metabolite. Once this metabolite has been provided it would then not matter whether the cells remained alive. Ellis and Spizizén [5] have recently shown, for instance, that cystine is an essential metabolite for a bacteriophage.

ENCEPHALITIS IN CHINA

WAR provides for parasites a golden opportunity to visit "fresh woods and pastures new." For some years past there has been widely distributed in Japan a form of encephalitis which to distinguish it from encephalitis lethargica has been termed encephalitis type B. There is some evidence that this infection is transmitted by mosquitoes, because its prevalence is greatest during the warmer months; but mice from apparently healthy stocks have been found harbouring the virus in their brains so that possibly animals may act as a reservoir.[6] It was believed that the infection was confined to Japan, but in the last few years—possibly because of the incident which is occupying the attention of the Far East—Japanese B encephalitis has appeared in China, and in the summer of 1938 an outbreak occurred in Peiping. Ten of the cases are described by Chu, Wu, and Cheng [7]: all occurred in children who were drawn from entirely different districts in the city and in no instance was there any history of contact between them. Three out of the ten died, and of the six whose sera were subsequently tested for immunity to Japanese B encephalitis and St. Louis encephalitis only one showed no immunity to the Japanese form, while all were negative to St. Louis encephalitis. This is in accordance with the finding of Webster [8] and others that no cross immunity exists between St. Louis encephalitis and Japanese B encephalitis. Using hyperimmune sera, however, Perdrau [9] was able to show that there is some slight antigenic relationship between the two viruses, the dimensions of which are both between 20 and 30 mμ.[10] Clinically the disease begins suddenly with fever, headache, and in about half the cases vomiting; drowsiness comes on early while other symptoms are tremor of the extremities or facial muscles, strabismus, Kernig's sign, rigidity of the neck muscles and Babinski's sign. In the cerebrospinal fluid the protein is invariably increased but the sugar content is normal. The total white-cell count varies from 68 to 88 per c.mm. with a high proportion of polymorphonuclear leucocytes. Sulphanilamide had no beneficial action. The fact that Japanese B encephalitis has left its island home for China suggests the possibility that it may spread to other countries in the Far East, if not further afield.

1. Bedson, S. P. and Bland, J. O. W. *Brit. J. exp. Path.* 1932, **13**, 461.
2. Bland, J. O. W. and Robinow, C. F. *J. Path. Bact.* 1939. **48**, 381.
3. Eisenberg-Merling, K. B. *Ibid*, 1940, **51**, 392.
4. Findlay, G. M. and MacCallum, F. O. *Brit. J. exp. Path.* 1940, **21**, 173.
5. Ellis E. L. and Spizizén, J. *Science*, 1940, **92**, 91.
6. Kawamura, R., Kasahara, S., Miyata, T., Ueda, M. and Yamada, R. *Kitasato Arch. Med.* 1940, **17**, 38.
7. Chu, F. T., Wu, J. P. and Teng, C. H. *Chin. med. J.* 1940, **58**, 68.
8. Webster, L. T. *J. exp. Med.* 1938, **67**, 609.
9. Perdrau, J. R. *J. Path. Bact.* 1940, **50**, 545.
10. Yaoi, H., Kanazawa, K., Murae, M. and Arakawa, S. *Jap. J. exp. Med.* 1939, **17**, 375.

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SPINAL ANALGESIA

SPINAL analgesia still gives rise to greater differences of opinion among anæsthetists than any other method commonly employed. Some hold that for nearly every abdominal operation endothecal injection is by far the best method, while others believe that to use this when there is no contra-indication to inhalation is to expose the patient to unjustifiable risk. Opinions also differ as to the technique to be employed if spinal analgesia is adopted. No doubt much of this divergence of view would disappear if all the parties had equal experience. The man who favours spinal analgesia and has made himself a master of it gets better results than the one who uses it only occasionally. Perfection of technique, in short, as well as careful selection of patients, plays a great part in determining the success of the spinal method. The basis of selecting patients has changed a good deal since the early days of endothecal injection. At that time the indication for a spinal injection was often held to be, as A. D. Morgan points out,[1] "he is too weak for a general, give him a spinal." Today the anæsthetist regards as the ideal subject for a spinal the muscular plethoric patient requiring an abdominal operation for which satisfactory anæsthesia by inhalation is likely to be extremely difficult, rather than the patient who is very feeble or shocked. Most anæsthetists regard late spinal-cord lesions following endothecal injection to be few or entirely absent. Many neurologists, on the other hand, maintain that they meet with undoubted examples fairly often. Sporadic attempts have been made by anæsthetists, by following up their patients, to verify or disprove this contention, and so far as they have gone these investigations justify the belief that such lesions are extremely rare, but the question is certainly not positively settled.

PERIARTERITIS NODOSA

PERIARTERITIS nodosa is a disease more often diagnosed on the post-mortem table than thought of at the bedside, but since the end of 1937 Grant[2] has observed 7 cases at Guy's Hospital. Of these only 3 have died. The diagnosis was made on clinical grounds and confirmed histologically in 4; in 2 others it was suspected during life, and in 1 case only was the diagnosis first made after death. Grant points out that our present knowledge of the disease is inadequate because it is largely based on examples recognised as such only after death, so that the clinical, and to a less extent the pathological, pictures are necessarily incomplete. Our present knowledge may be compared to what was known of endocarditis at the middle of last century, before the rheumatic type was clearly differentiated from the acute and subacute types. The general picture is commonly that of a subacute illness with remissions and exacerbations, characterised by low and irregular fever, tachycardia out of proportion to the fever, leucocytosis (sometimes with eosinophilia), anæmia, progressive weakness and loss of weight; but any of these signs may be absent. The local manifestations of arterial damage are protean; such pointers as nodules along a superficial artery, pulsating subcutaneous nodules, obliteration of the pulse in small arteries, Raynaud's phenomenon or gangrene of the extremities, or anginal pain in a young subject, may give a clue. Nephritis may be suggested by affection of the renal vessels, appendicitis or duodenal ulcer by lesions of the mesenteric vessels, arthritis by lesions of the vessels to the joints, and peripheral neuritis or palsies may be caused by damage to the vessels supplying the peripheral nerves. The frequent occurrence of asthma in these cases is not so easily explained on a vascular basis.

1. *Med. J. Aust.* July 6, 1940, p. 1.
2. Grant, R. T. *Clin. Sci.* 1940, **4**, 245.

If the disease is as common as Grant suggests many cases must at present be missed. The diagnosis of periarteritis should therefore be seriously considered when an unusual combination of symptoms arises such as nephritis in a case resembling acute rheumatic carditis, or an unusually high eosinophilia in a case of asthma. Evidence of local arterial damage should then be sought and the diagnosis clinched by biopsy of one of the affected arteries, for which serial sections may be required. It is clear from this study that the disease does not carry the gloomy prognosis formerly associated with it. Of those cases diagnosed during life—about 50 in all—half recovered, at least temporarily. It seems probable, therefore, that the incidence of cases with an immediate fatal termination will decrease as the diagnosis is more often made during life. No effective treatment is likely to be suggested until more is known of the course of the disease.

ROCKY MOUNTAIN SPOTTED FEVER

THE first description of Rocky Mountain spotted fever was written by a United States Army surgeon[1] in 1896 from Idaho: it is now usually believed to exist in two forms, a western and a less deadly eastern type. The western form is confined to Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon and California, but the eastern form has been gradually spreading and has been reported from 32 eastern states, the only ones not at present infected being Maine, New Hampshire, Vermont, Connecticut and Wisconsin. There is, however, little if any clinical basis for differentiating the two types though in the western variety the rash is more intense and more widely distributed, the febrile period is longer, the headache, muscular pains and arthritic symptoms more severe, and the tendency to produce small petechial hæmorrhages in the retina more pronounced. Although the incidence of the disease is not great, it has caused enough deaths to make it a serious medical problem. Moreover, in the first week, before the rash appears the diagnosis from typhoid, undulant fever or perhaps tularæmia may be difficult, and the rash may lead to confusion with typhus.[2] Of the 7 cases seen by Campbell and Ketchum[3] in Washington, D.C., 3 died. This 50% mortality is based on too small a sample to be of value, but in an analysis of 2036 cases made by Hampton and Eubank[4] 1435 cases of the western type had a case-fatality rate of 19·4% while during the same period the rate among 601 cases of the eastern type was 18·1%. The chief symptoms apart from the rash and fever were disorientation and irritability, headache, chills, injection of the conjunctivæ, meningeal irritation, coated tongue and photophobia. All the 3 cases that died suffered from bronchopneumonia and in addition to petechial hæmorrhages in the skin and white matter of the brain had subserous hæmorrhages in the brain, heart, kidneys, bladder and lungs; areas of focal necrosis were noted in the heart, brain, spleen, kidneys and testes, and in one patient cortical hæmorrhages were present in the right adrenal. Sulphanilamide was of no value, thus confirming the results obtained by others who have used sulphanilamide and sulphapyridine without success. There is evidence that the degree of immunity cannot be measured by means of agglutination reactions with proteus OX 19.

The sixth list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £10,400.

1. Report of the Surgeon-General, U.S. Army, 1896, p. 60.
2. Cohen, M. H. *J. Amer. med. Ass.* Oct. 26, 1940, p. 1441.
3. Campbell, E. P. and Ketchum, W. H. *New Engl. J. Med.* 1940, **223**, 540.
4. Hampton, B. C. and Eubank, H. G. *Publ. Hlth Rep. Wash.* 1938, **53**, 984.

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In England Now

A Running Commentary by Peripatetic Correspondents

BICYCLING, to which I have come back after twenty-odd years of abstinence, gives longer time for rumination than more rapid forms of transport. As I pedalled along a country lane the other day I realised for the first time a curious fact—with the exception of the wild buffalo, which, so it is said, charges at sight, and in any case is so poorly endowed with grey matter that it is only just not anencephalic, every species of animal and bird avoids danger like the plague, unless it is forced to fight for its food, its mate or its young. Men, on the other hand, with the possible exception of the Chinese, seem to take a positive pleasure in getting themselves into dangerous situations quite unassociated with the satisfaction of any of their primary instincts. Even this bicycling business, for instance, must have been quite risky in its early days. My father has told me that when he was a student it was the commonest thing in the world to take a toss over the handle-bars of the old penny-farthing. Even the so-called safety bicycle had a slight element of risk in the days when one put one's feet up and coasted. A long hill near my home had at the bottom an old farm, and at every hour of the day, or so it seemed, cows were going to or coming back from milking. With the free-wheel there is no longer any trace of danger in cycling. Motoring, too, in Edwardian days was not without a thrill. When my father first bought a car somewhere about 1907 the whole village turned out to watch our departures and returns. Once on coming round a corner in a narrow lane we met a traction engine going full speed ahead with no-one on the look out, but by backing hard and running into a gateway we got off with only a crushed wing. On another occasion going along a sunken lane a cow which was looking over the hedge was so overcome at our quaint appearance that she collapsed into the road with a crash, missing the car by inches. Now, except for those who can race at Brooklands or beat speed records at Daytona Beach, there is no excitement in motoring. Peace-time flying has also become nearly fool-proof; to listen to commercial pilots talking is to realise that there is little difference between flying a plane from Southampton to Brindisi and driving a bus from Southgate to Bromley.

So far as existence in peace-time is concerned the small amount of danger left is entirely reserved for the favoured few who can still go down the Cresta run, ride at Aintree, or, if their fancy turns that way, play with pathogenic viruses that may turn and bite them. For the vast majority the only way to satisfy in some measure the desire for danger has been to participate vicariously in such things as dirt-track racing or all-in wrestling. All that is changed now and as in every other war the suicide-rate has gone down with a bang. Is it not possible that the too great security of life was one of the reasons why Nazism and all the other combative isms were so eagerly embraced by ardent youth? The essential bellicosity of over-civilised man may be merely an attempt to live more dangerously. This bellicosity, if one looks at it historically, is a comparatively new thing. In the Middle Ages the difficulty was to keep the feudal hosts together and prevent them from drifting back to the farm even after they had seen Paree. Later, in the Thirty Years War for instance, most of the fighting was done by mercenaries who acting on a strictly cash basis were only too ready to go over to the other side if offered five shillings a week more wages. Only when plagues, pestilences and famines ceased and life took on a slightly more stable aspect did the masses become really bellicose.

At this point in my cogitations there arose the familiar sound of aeroplane engines accompanied this time by the rattle of machine-gun fire. A Messerschmitt streaked across the sky followed by four of what our old gardener calls "them there Spitfire boys." In less than two minutes they were out of sight again—the hounds of heaven that "follow, follow after" in real life. Here, at least, was the quintessence of danger and excitement. By now I was at my destination, the Company Commander's meeting of a Home Guard battalion consisting of a dozen staid citizens, all over forty-five, who, as veterans of the last war, ought to have had enough excitement to last a lifetime, yet they had taken this chance of looking once more into "the bright eyes of danger." But why "the bright eyes"?

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A lot of doctors say that now the papers have published the news that there is a fear of illness through overcrowding in shelters their patients are hurriedly paying their old bills. This is as it should be, though of course the lengthy credit taken is often due to the doctor being too lenient in money matters with patients. My own doctor is very fond of his own story about this. He was called up one night to the house of a man who was as much a friend as a patient; the man's wife gave birth to a fine pair of girls. While the doctor and the man were having a few drinks to celebrate the auspicious occasion the former mentioned in passing that his bill was now in the region of £175, whereupon the man got out his cheque book and started to make out the cheque. "Put that book away to-night for heaven's sake," cried the kind doctor. "A time like this is not the time for paying cheques." The man put his cheque book away.

Next week he phoned the doctor and told him that he was completely bankrupt; as an importer of fruit the whole of his capital was in a shipful of Canary bananas which had sunk; for some reason this particular consignment was uninsured.

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The other day the hygiene doctor visited our battalion. I have no idea how many pips he had—or crowns—for he had his mackintosh on. I think he really came to see if the men's quarters were overcrowded—which they undoubtedly are. But it is no easy thing to turn a battalion out of its quarters once they are installed, and he was disappointed. Then he went along to the cookhouse just as the rations arrived, and saw some whole cod lying on the table, the end of one looking a bit dirty, having fallen in the mud—a thing that happens frequently in the Army. My pips were showing as I was in battle dress—one on each shoulder—so he had a great advantage over me. He asked me four irrelevant questions about the fish, which was in perfect condition, and I said "Sir" in answering the first and the fourth. He then asked the value of the fish; I replied that it was about £4 15*s.*, whereupon he triumphantly said that food up to the value of £5 could be condemned. I replied that nothing would please me more if he could be certain of getting me something as good or better for the men's teas. So he walked away. If he really thought the fish was bad it seems he did as much wrong in not condemning it on the spot as I would have done in serving it for tea if it had been. If he did not think it bad it was not in good taste to cast aspersions on it.

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Any student of juvenile fiction will know that there are two essentials: one, the young reader must be able to identify himself with the hero; two, this person should be accused or at any rate suspected of some crime, the fouler the better, of which he is, of course, innocent, though his innocence must not be established until the last chapter, when the Colonel pats him on the head, brokenly murmuring, "England could do with more like you, my lad." This murky pleasure of feeling unjustly suspected and its orgasm of proved innocence is by no means lost in adult life, and I often come across traces of it in country practice: "They say I brought that miscarriage on myself, doctor, I know they think that I don't keep my house clean." I fancy it is a natural mechanism which prepares one for rebutting possible accusations—a studying of briefs on spec.—and that we all have it, but it only outs in people who by living alone are really in the same position as tribal outcasts, to whom the mechanism was no doubt very useful; a defence mechanism for the unfortunate, which, when it runs the machine, is paranoia. Other people, isolated by their position, like dictators, some royalties, some masters of ships, some headmasters, who to a large extent are immune from criticism—heavenly beings who have no other stellar bodies to keep them in their right position in space—also become queer, but more often incline to the manic-depressive type. I take it that a touch of mania with its superb egotism, insistent leadership,

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fearlessness, and energy was a great asset to a leader in tribal warfare, and to some extent still is. The depressed stage is probably just a rest after the manic expenditure of vital energy. Personally I think that almost any man who had a long spell of omnipotence and adulation would tend to become manic and that anyone who had a long spell in the wilderness would verge towards the paranoiac, and that both states were, originally at any rate, not so much mental abnormalities as compensatory gifts, enabling their possessors to fulfil some particular function. Whether the manic leader and the paranoiac leader with their over-reaching, faulty judgment can function for long in the larger modern world is a question of moment.

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One of the things I have against my hens is that they unduly fascinate my yearling child, who, balanced precariously on tip-toe and with nose pressed against the window-pane, studies them closely and long to the exclusion of more urgent matters. So rapt was he in contemplation the other day that he neglected to exercise his growing powers of sphincter control. Thoughtfully watching the stream trickling down his leg he suddenly became sanitation-conscious, and seizing from a near-by chair the handsome scarf knitted by his sister for the R.A.F., proceeded vigorously to mop up the pool on the floor. I should be grateful if some child psychologist could inform me whether this action is to be interpreted as an early manifestation of a desire to take up public-health work. Or did the scarf symbolise the R.A.F. in his infant mind and the puddle the Luftwaffe?

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That ten days' holiday lays pleasant in my memory, though it was November. Our principal occupation was gathering Spanish chestnuts; a wonderful year for them. A glove helps to thwart the prickles, but my partner developed a pretty technique with a clasp knife. There is something very satisfactory in turning out of each pod the lovely brown nuts, glistening and inviting and contrasting with the beautiful silver fur lining of the pod. We saw only one other human on like quest in this wood, a lad who said he got a hundredweight the day before, for which he got 12*s.* in Hastings, but we saw lots of evidence of other robbers—grey squirrels, mice, and birds—so that we often wondered how any nuts finally escaped to reproduce their kind. Groping about on that lovely damp-smelling autumn carpet I seemed to hear a conversation between a buxom and a lank woman which began several million years ago. The chestnut said she believed in starting her children well, a good store of starch in the cotyledons, enough to last them till their roots were well down. The ash laughed at this pampering; she believed in treating them rough, chucking them to the four winds. "Some of them will worry through," she laughed callously. Then the mammals and the birds came, and the ash rocked with creaky laughter. "Look at your store now, it's being eaten by these legged things. Ha-ha." The chestnut must have wept bitterly for thousands of years over this, but thanks to a forgetful squirrel or two she managed to survive. Then, as in all proper stories, in the end the wrongs were righted, for the mammal man liked the nuts so much that he cultivated them and took them all over the world, and I too planted a number in gratitude. Sometimes in the droning November wind I heard the chestnut boasting again. "Of course, we come from an old Greek family . . ." "only came over here for the week-end with the Romans," "Lovely nuts, aren't they? I do believe in starting . . ." We tried various ways of cooking them. Boil for ten minutes and serve with jam or golden syrup; they are wonderful. Boil and mash with bully beef and fry; they make even that recurring ration interesting. Boil and fry with bacon; superb! One day we found an unexploded incendiary bomb embedded in the ground. We took the head warden and the village bobby up to see it. I noticed the bobby filled his pocket with nuts and ate them raw.

The work of the Tavistock Clinic continues as usual, at Westfield College, Kidderpore Avenue, London, N.W.3 (Hampstead 0136). Since the outbreak of war, the waiting-list has been abolished for adults and children.

Special Articles

SCOTLAND

HOSPITAL FINANCES IN EDINBURGH

A REPRESENTATIVE of the board of managers of the Edinburgh Royal Infirmary addressing a meeting of the league of subscribers complained that costs were mounting and revenue decreasing. The situation was going to be serious even allowing for a slight saving due to reduction in the number of occupied beds, and for the national payments received for reserved beds. True a substantial amount had been received in the form of bequests, but, in view of present conditions, that source of help could not be relied on in the future. The income available for the maternity pavilion was totally insufficient and discussions were going on between the local authority and the managers, who felt that the responsibility for the upkeep of this service should be shared by others. The whole position of voluntary hospitals called for reconsideration, and though it would seem inadvisable to make them wholly state institutions, some intermediate scheme, whereby hospitals could become state-aided without being state-controlled, might be devised. The advent of municipal hospitals, with conditions of individual payment, had introduced an unwelcome change to a public accustomed to the ways of the Royal Infirmary. Endeavours had been made to get the town council to give free treatment, without success, and the likelihood of a change of policy was now somewhat remote.

The league decided to start negotiations to arrange that any subscriber to the infirmary who requires to enter a municipal hospital will have his payments made out of a special league-of-subscribers fund by the treasurer of the infirmary.

CIVILIAN PATIENTS IN EMERGENCY HOSPITALS

The insurance committee of the County of Lanark recently invited the Department of Health to utilise part of the accommodation of emergency hospitals for ordinary civilian cases. The proposer of the resolution said that doctors in Lanarkshire had been striving for many years to secure the development of improved medical services for the community. Since the war a proportion of the hospital beds had been reserved and the result had been that the admission of civilian cases had been delayed more than ever. Several emergency hospitals had been started in Lanarkshire; one with 600 beds—to be increased to 1300—and with a staff of 180 people, including several resident doctors, had 27 beds occupied. Nurses, becoming bored, were leaving; staffs could not be kept at concert pitch if they had no work to do. If the department would allow a proportion of these empty beds to be used for civilian cases it would relieve the present situation and would benefit the hospitals by keeping the staffs occupied. Should the beds occupied by civilian cases be required for military patients, the civilians could be transferred.

EDINBURGH CHURCH CLINIC

A family clinic is being formed in connection with Davidson Church, Eyre Place, and it is hoped that the premises taken in Fettes Row will be in working order by the new year. Dr. M. Winifred Rushforth and Dr. Elizabeth V. MacLeod, who are to assist at the clinic, were present at a meeting, held on Nov. 3, of those interested. The Rev. Roy Hogg, who took the chair, said that the purpose of the clinic would be to treat cases of maladjustment, faulty social behaviour and breakdown in health. Security was primarily to be sought in the parent-child relationship, so that the clinic unit was to be the family. As soon as there was a large enough medical staff the clinic would deal with children and adults suffering from psychogenic disorders. Dr. McLeod made it clear that the approach to maladjusted children would be by play therapy. Thanks to the co-operation of some of the Edinburgh physicians, children would be given medical as well as psychological treatment if they needed it. Dr. Rushforth saw the clinic as coming into being not so much in spite of the war as because of it. Hitler, by persecuting the Jews, had

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dispersed psychotherapeutic workers all over the world, and many of them had been received in England and Scotland. She is right in supposing that they cannot fail to give impetus to the study of psychotherapy.

DERMATOLOGICAL HINTS TO PRESCRIBERS

THE Therapeutics Requirements Committee of the Medical Research Council have now supplemented their memorandum on economy in prescribing with the following suggestions about drugs used in dermatological practice.

Ointments.—For many of the purposes for which ointments are prescribed pastes and creams are more satisfactory and require only about half the amount of fatty basis. Fatty vehicles can sometimes be replaced by wet dressings (with or without mucilage), antiseptic paints and varnishes, or powders.

Antiseptics.—Boric acid and iodine need not be used in dermatology. The amount of mercury used could be greatly reduced and it need only be available for trial in cases in which alternative antiseptics have not proved satisfactory. If the antiseptics for local application to the skin were limited to aniline dyes, coal-tar derivatives, salicylic acid, sulphur, ichthammol, resorcin, dioxyanthranol, silver nitrate and tar, the treatment of most skin diseases would not suffer greatly. Tar in the form of crude gasworks tar is efficient and cheap.

Ringworm.—Mercurials and iodine are rarely required for the treatment of ringworm, whereas a paint containing fuchsine and Whitfield's ointment of benzoic and salicylic acid are effective remedies which are freely available.

Scabies.—Should epidemics of scabies occur, treatment will be most economically carried out if put under the control of doctors with special knowledge of skin diseases. A large number of chemical substances will destroy the acarus and all local treatments depend largely on the efficiency of application. Sulphur ointment still remains one of the most efficacious remedies [1] and the frequency of sulphur dermatitis has been overstated. If supplies of benzyl benzoate are short this substance would be best reserved for treatment of children.

Pediculosis.—For body lice a thorough bath and a change of clothing usually suffice. Oily dressings are not essential for pediculosis of the body and scalp. Head lice can be killed by soaking the hair in carbolic lotion (1 in 40) for about an hour, and the nits can then be removed with a fine comb after the application of vinegar or dilute acetic acid. Oily applications are of some value in pediculosis pubis, and an ointment of 5% β-naphthol may be applied after shaving the affected area.

The committee have divided drugs used in dermatological practice into the same groups as they used in their previous memorandum.

In class A they place drugs which they regarded as either readily available or essential. This category includes: acriflavine, aniline dyes, benzoic acid, calamine, chloroform, coal tar, ether, hydrochloric acid, hydrogen peroxide, ichthammol, kaolin, light magnesium carbonate, lysol, phenol, resorcinol, salicyclic acid, silver nitrate, sodium bicarbonate, sulphur, tannic acid, wool fat, zinc oxide, and zinc sulphate.

Class B includes drugs which the committee consider essential for certain purposes but whose use should be restricted. Their suggestions for substitutes are given in parentheses: aluminium acetate (lead acetate), ammoniated mercury, benzoinated lard, borax should be reserved for hydrous ointment (the glycerin and the honey of borax may be replaced by watery solutions of aniline dyes in the treatment of thrush), boric acid (saline compresses instead of boric fomentations; for dusting powders talc, zinc oxide, magnesium silicate or kaolin), chrysarobin (dioxyanthranol), glycerin, iodine (proflavine, acriflavine, trinitrophenol, crystal violet, or brilliant green), liquid paraffin, magnesium sulphate (sodium sulphate), mercuric chloride, olive oil, sesame oil (peanut or other vegetable oil if available), soft paraffin, starch, and zinc oleostearate.

In class C, which contains drugs whose efficacy does not justify importation or manufacture in war-time, they place almond oil and sulphurated potash. They suggest that sulphur ointment or a solution of sulphurated lime may be substituted for the latter.

1. Cf. *Lancet*, 1940, 1, 602.

Parliament

MANY members of the House of Commons are still uneasy about the economic side of our war effort. They feel that while Parliament and the country have entrusted ministers with very wide and comprehensive powers, and shown their willingness to expand those powers to any necessary extent, the Government has shown a certain reluctance to adopt an all-in policy which would raise our production of war equipment in the shortest space of time. This point of view found expression in some remarkably frank speeches during the debate on the address in reply to the Gracious Speech from the Throne. Mr. Shinwell, for example, begged ministers not to be over-sensitive to criticism and to realise that more was to be gained by being receptive than by being obstinate. There was, he declared, lack of cohesion in Government speeches on our productive power; the Government should perform like a symphony orchestra and not like a jazz band. The nation had no desire to be fobbed off with an exaggerated optimism which had no foundation in fact. The people would not fail because they knew the worst, but there was a danger of complacency when ministers indulged in fairy tales. Mr. Greenwood, who is the minister in the War Cabinet charged with the general supervision and coördination of our war economy, admitted that recent enemy air-attacks had retarded our expanding productive programme, but he denied that those attacks had eaten to any serious extent into our productive capacity. At the same time he did not pretend that we were at the end of our difficulties; on the contrary he warned the House that those difficulties would increase. But Britain's resources and capacity, with the growing help of North America, outmatched the industrial resources and capacity of the enemy. Our increasing productive power, both in quality and weight of output, Mr. Greenwood concluded, would finally crush the might of the dictators.

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Mr. Herbert Morrison, Home Secretary, in a statement of Government policy in regard to the release of interned enemy aliens said that he was taking steps to secure that scientists and experts who were required for work of national importance were released as quickly as possible.

Evidence that the Government are fully aware of the vital importance of safeguarding the food supplies of the nation was given this week in an important announcement by the Minister of Agriculture. Mr. Hudson told the House of Commons it had been decided to guarantee that the present system of fixed prices and an assured market for agricultural products would be maintained for the duration of hostilities, and for at least one year thereafter. Prices will be subject to adjustment to the extent of any substantial changes in cost of production. This decision is intended to secure that stability shall be maintained in the agricultural industry during the war and for long enough after it for a permanent post-war policy for home agriculture to be put into action. It is believed that with this extended guarantee our farmers will respond with energy to the Prime Minister's call for the greatest volume of home food production of which our land is capable.

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An echo of the controversy over the Horder report on air-raid shelters was heard during the debate on the address. Mr. Kenneth Lindsay maintained that the official statements that there was not a report but only a verbal intimation, and that the report could not be published on security grounds, were misleading and called for some further explanation. If the preliminary recommendations—which presumably were written—had been published two months ago, said Mr. Lindsay, they would have given to hundreds of workers in London, apart from borough medical officers of health, some clear lines on which to work. The absence of those recommendations had meant that many voluntary workers and others had not been clear on Government policy. He was amazed to see that the Minister of Health in an interview published in a reputable paper had told the British people that after two months of warfare on the home front there were 50 first-aid medical posts in the shelters. To Mr. Lindsay's personal knowledge voluntary shelter

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workers had produced more than 50 first-aid posts during the last six weeks, before these official ones were started. He gave some idea of the scale of the problem by saying that something like 750,000 people still used the air-raid shelters. He urged the Government to do one of two things: either appoint a health commissioner with full plenary powers for London—preferably Lord Horder himself; or make more real the line of organisation between the Ministry of Health and the regional commissioners. If Admiral Evans went round the shelters night after night and reported that the people under Wapping Arches were still experiencing water dripping from the walls, and still had no proper sanitation or light, nothing necessarily happened. It was no good appointing more medical inspectors; what was wanted was action at the periphery, if need be bringing in the Royal Engineers to help with the structural alterations. Mr. Atlee, the Lord Privy Seal, in his reply had not much comfort to give to Mr. Lindsay. He admitted that there was still much to be done in regard to shelters, but claimed from personal knowledge that the work was going actively forward.

QUESTION TIME

American Doctors in England

Sir THOMAS MOORE asked the Home Secretary why American doctors, graduating in Scotland, were not allowed to work in this country instead of priority arrangements being made for them to return to the United States of America.—Mr. O. PEAKE, under-secretary to the Home Office, replied: It would not be in the interests of the British medical profession that all persons of foreign nationality who come to the United Kingdom for a course of study or for the purpose of obtaining a British medical qualification should be free to establish themselves as medical practitioners in this country, and the practice has been to admit such foreign visitors on the understanding that they will leave when they have completed their course of study. It has, however, recently been decided that, in existing circumstances, Americans and nationals of other friendly countries who have obtained a British degree may remain here temporarily and be allowed to take certain appointments such as that of house-surgeon or physician in a hospital or the position of assistant or locum tenens to a British medical practitioner.

Sir T. MOORE: Why should there be any restriction on the services of these qualified trained professional people who are willing to come to our assistance in these times of shortage of medical staff throughout the country?—Mr. PEAKE: There is an embargo on their services in view of a recent change in policy, and I trust that no American doctor has been subjected to any disadvantage in England on account of the fact that he has graduated in Scotland.

Mr. J. J. DAVIDSON: In order to utilise fully the services of these doctors would the Minister consider setting up a separate war-time register?—Mr. PEAKE: That proposal would have to be very carefully considered.

Sir FRANCIS FREMANTLE: Is it not true that American doctors have very varied qualifications many of which are quite inappropriate and unsuitable; others are very good and they ought to be used? Therefore there should be some distinction.—No further answer was given.

Distribution of Milk

Captain L. F. PLUGGE asked the parliamentary secretary to the Ministry of Food whether he was aware that, notwithstanding that the supply of all milk for evaporated milk for the fighting service was no longer available, the liquid milk market was already 70,000 gallons a day short and was expected still further to decline; and what steps he was taking to deal with the shortage.—Major LLOYD GEORGE replied: I am aware that there is at the present time some shortage of milk for liquid consumption, occasioned by a fall in production coincident with a substantially increased demand. The agricultural departments are at present in consultation with representatives of the milk producers discussing the possibilities of increasing the output. The milk-marketing boards are responsible for the equalisation of bulk supplies, so far as is practicable, as between the various consuming areas. By means of voluntary pooling arrangements, the dairymen in those areas in which a shortage exists are giving priority to invalids, mothers and children, and equalising the remaining supplies to individual consumers.

In answer to a further question he added that steps were being taken to import dried milk from Australia and elsewhere to help make up the present shortage of produced milk.

Mr. F. MESSER asked the President of the Board of Education if he could state the consumption of milk in schools in June, 1939, and September, 1940.—Mr. HERWALD RAMSBOTHAM replied: The consumption of milk under the milk-in-schools scheme amounted to 2,689,000 gallons in June, 1939, and to 2,163,000 gallons in June, 1940—the latest month for which figures are available. The number of school days in June this year was two less than in the previous year.

Mr. E. SHINWELL asked the Parliamentary Secretary to the Ministry of Food whether he was aware that the arrangements for the provision of free and cheap milk for school-children in many schools in the county of Durham had broken down; that for many weeks children had had no milk, although ordered by the medical officer to be supplied with it; whether this was due to a shortage of milk or the refusal of distributors to bottle milk because of the extra cost entailed; and what steps he was taking to deal with the position.—Major LLOYD GEORGE replied: I am aware that certain schools in the county of Durham and elsewhere have not been receiving supplies of milk recently under the milk-in-schools scheme. The Minister has recently been in touch with the distributors and he hopes, with their coöperation and the assistance of the milk-marketing boards, to make arrangements for the maintenance of the supply of milk to schools.

Health in Shelters

Mr. K. LINDSAY asked the Home Secretary if he would indicate what were the respective functions of his department and the Ministry of Health in connexion with matters affecting health in public shelters.—Mr. H. MORRISON replied: The Ministry of Home Security is the central department primarily responsible for shelter policy, but the Ministry of Health undertakes responsibility for matters relating specifically to public health. Under this arrangement the Ministry of Health is the executive authority for the appointment of doctors and nurses to attend persons in shelters, medical inspection, and measures to prevent the spread of disease. The Ministry of Home Security is the executive authority for matters arising out of the design and construction of shelters and their fittings. In all matters affecting the public health, whether directly or indirectly, close liaison is maintained between the two departments and circulars or general statements on these matters are not issued by one department without prior consultation with the other.

Mr. O. E. SIMMONDS: What powers are possessed by the police or wardens to enforce the removal from public shelters of persons who are medically certified to be a potential danger to other shelterers?—Mr. MORRISON: A regulation is about to be made which will enable rules governing conduct in shelters to be issued. It is proposed to deal in these rules with the question of persons suffering from infectious or contagious disorders.

Mr. BROOKE: What progress has so far been made in London to carry out the Horder committee's recommendation that, wherever possible men's closets should be placed just outside air-raid shelters and not inside; and are chemical closets to be substituted entirely for open pails when closets are inside shelters?—Mr. MORRISON: Some progress has been made in carrying out this recommendation, where it is practicable to do so, but I am not in a position to give precise details. It is the intention that chemical closets, or in some cases water closets, should be substituted for open pails.

Steel Helmets for Hospital Staffs

Mr. F. MESSER asked the Minister of Health if he was aware that members of the staffs of hospitals, exposed to danger during air-raids, were still unable to obtain steel helmets; and if any action was being taken to deal with the matter.—Mr. M. MACDONALD replied: Issues of steel helmets are being made on the requisition of scheme-making authorities and, in London, on that of the governing bodies of the voluntary hospitals, to all hospital staffs required to work in the open during air-raids. This distribution is approaching completion.

Diphtheria Immunisation in Lincolnshire

Mr. W. LEACH asked the Minister when immunisation against diphtheria was first introduced in the county of Holland, Lincolnshire; what had been the yearly number of children immunised; and what proportion was this of the total child population of the district.—Mr. MACDONALD replied: Immunisation against diphtheria by local authorities

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was first introduced into the county of Holland, Lincolnshire, in 1933. The total number of children immunised during the years 1933 to 1939 inclusive was 12,628, giving an average yearly figure of 1804; but I should add that 8962 out of the total of 12,628 were immunised in 1939. It is estimated that about 60% of the present child population of the county of and below school-age are immunised.

Responsibility for Evacuees

In reply to a question Mr. MACDONALD said that the general principles governing the financial adjustments between evacuating and receiving authorities are on the basis that no additional cost should fall on the receiving authority in respect of persons or children received in the area under the Government evacuation scheme. Additional expenditure incurred by the receiving authority is borne by the Exchequer but expenditure which—apart from evacuation would have been borne by the evacuating authority remains the liability of that authority.

Private Houses as Hospitals

Miss T. CAZALET asked the Minister whether he could state the number of private houses which had been acquired for hospitals and convalescent homes in reception areas; the number of these which were at present full; the number partially full; and the number still empty.—Mr. MACDONALD replied: Under the Emergency Hospital Scheme, arrangements are being made by the war organisation of the British Red Cross Society and Order of St. John of Jerusalem to open approximately 200 private houses as auxiliary hospitals. So far only 70 of these are ready to receive patients, approximately 50% of the beds being occupied. A considerable reserve of empty beds must be kept for casualties and sick during the winter months. In addition, 150 houses are being adapted and equipped as annexes to existing hospitals. I have no separate figures showing the present occupancy of these annexes, but they are brought into use as part of the parent hospital as soon as they are open. The majority of the 350 houses will be in reception areas.

Oil Products and Purchase Tax

In reply to a question Sir KINGSLEY WOOD said that olive oil is liable to tax if put up for medicinal, veterinary or toilet use and liquid paraffin is also liable to tax.

Anti-tetanus Inoculation in the Army

In reply to a question the Secretary of State for War said that among the wounded of the B.E.F. there were eight cases of tetanus. Three of these had received prophylactic tetanus antitoxin but none had been previously immunised with tetanus toxoid.

Tannic-acid Treatment for Burns

Mr. E. THURTLE asked the Minister of Health if it was on expert medical advice that his department recommended to all air-raid precautions authorities that tannic acid was the most efficacious treatment for burns, and urged that the necessary stocks should be acquired for such treatment; if it was on the advice of the same experts that the authorities were now being advised that this treatment was unsatisfactory; and if he would say when, and on what grounds, his expert advisers changed their minds.—Mr. MACDONALD replied: The answers to the first and second parts of the question are yes. Experience in the past few months—which in the case of burns has been much wider than it could ever be in peace time or in the last war—has shown that tannic-acid treatment is not satisfactory for certain types of burns. With the coöperation of the Medical Research Council the situation is being watched closely by experts of world-wide reputation.

On Dec. 3 the parliamentary correspondent of the *Times* said that it was estimated that there are 92,000 children of school age still living in the London County Council area, East Ham, and West Ham, of whom only 25,000 are going to school.

In the L.C.C. area there are 23,000 children attending the 365 schools which remain open, but the parents of the other 60,000 children believed to remain, prefer to keep them at home. Schools are also open at West Ham and will shortly reopen at East Ham. During the last few weeks 29,000 children have been evacuated from the L.C.C. area, and the council have now announced that it proposes to make school attendance compulsory for those who remain.

Letters to the Editor

SCARCITY OF OPHTHALMIC DRUGS

SIR,—I feel sure I shall be voicing a complaint which will find support amongst ophthalmic surgeons in this country in drawing attention to the increasing difficulty in obtaining supplies of essential ophthalmic drugs. Hyoscine, which before the war was from 20*s*. to 30*s*. an ounce, now stands at £26 to £30 an ounce. Even at this exorbitant price it is impossible to obtain more than a gramme at a time. As is well known it is an essential drug in the treatment of patients who suffer from atropine irritation, besides being a useful drug for cases requiring a mild mydriatic. Homatropine, in many ways a more essential drug, as it is used so extensively in refraction work, is almost as unobtainable, and has more than trebled in price. Duboisine is almost unobtainable and the only other obtainable mydriatic is cocaine, which is unsuitable for cases of atropine irritation. It is not beyond the powers of the responsible authorities to secure supplies of these drugs, as they are by no means the monopoly of Germany or German-occupied territories. I write this now before it is too late, and before ophthalmic surgeons are reduced to a condition of partial paralysis by starvation of these essential drugs.

Royal Eye Hospital, S.E.1. T. M. TYRRELL.

PROTECTION AGAINST LITIGATION

SIR,—The council of the Medical Defence Union has just approved an important modification of policy to become operative on Jan. 1, 1941, whereby it will not be practicable in future for principals to protect themselves from actual or threatened litigation against them in person arising out of the alleged acts or omissions of their named assistants who are not members of a defence organisation on their own account.

In the past the union accepted this liability where the principals, who were already members, named their assistants and paid an additional subscription of 10*s*. per annum. It is now deemed necessary and desirable that all assistants and locums should be members of a recognised medical defence organisation to acquire full protection on their own behalf as well as joint protection with their employers, provided the employers themselves are members of a reciprocal defence body. Principals should immediately inquire of their assistants whether they are at present members of a medical defence organisation and in benefit, and, if not, they should insist upon the production of evidence of membership at an early date. It is only by taking a precaution of this nature that principals can be protected adequately against the ever-growing litigiousness of patients, private and hospital alike, and of their relatives who are justifiably or unjustifiably dissatisfied with the professional advice or treatment received.

ROBERT FORBES,
Secretary, Medical Defence Union.

Bonnington, Stone Grove, Edgware, Middlesex.

THINGS TO COME

SIR,—I welcome Dr. Aleck Bourne's letter, urging a totally new outlook on health as the guiding principle of the future medical service. But anatomy and physiology, the knowledge of structure and functioning, have surely since Harvey's time been the basis on which knowledge and treatment of disease is taught. The main reform now required is in the teaching and status of anatomy and physiology, which must be extended first to the processes of fatigue, exhaustion, abuse and decay; secondly to treatment of any impairment of structure or function in its earliest stage; thirdly to defence from accident or pathological aggression; and throughout to the life, circumstances and habits of mankind, both in the individual and in the community. On this basis pathology and the science and art of medicine and surgery would be developed in more logical sequence and relation; prevention and application to the community would be essential to the consideration of each disease, even at the bedside; and a course of public health would need only a training, practical and

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on paper, in organisation, legislation and administration of the public services. This would, however, mean extensive changes in medical schools and examinations.

But it is one thing to design a picture, another to paint it. There will be "the same opposition to reform," as throughout the age-long history of medicine, not from a minority but from the mass of the profession, both in general practice and in the consultant ranks, not from lack of good will but from lack of vision and from habit. Better the ills you know, say most men, patients and doctors, than those you know not (clearly) of. In Parliament we know how carefully to consult all interests, and to persuade rather than compel the hindmost. Sir Ernest Gr ham-Little—not as he suggests "the only member of the Parliamentary Medical Committee holding consultant status," for Colonel Sinclair was a consultant surgeon and I am a consulting M.O.H.—considers consultants underrated in proposals for medical planning. But Parliament does not believe in proportional representation of interests on advisory bodies. General practitioners, who form the bulk of the profession, are most concerned with any proposed reform and they broadly represent all patients, ailments and conditions of practice. Sir Ernest rightly says that consultants must be watchful of their interests; but consultants must, still more, use their opportunities to lead the profession.

Hatfield, Herts. FRANCIS FREMANTLE.

ANÆSTHESIA IN THE SHOCKED PATIENT

SIR,—In their letter of Nov. 23 Mr. Ruscoe Clarke and Dr. Kessel urge further exploration of the use of local analgesia in the prevention and treatment of wound shock. H. Mahaffey (*Anesth. Analg.* 1939, 18, 200) reports the results of his investigation into suitable nerve blocking for injuries—e.g., brachial-plexus blocks for extensive injuries of the arm. The results were uniformly disappointing; a further fall in blood-pressure occurred and the procedure was deemed to be unjustifiable.

St. Albans. C. LANGTON HEWER.

TREATMENT OF BURNS

SIR,—We have read with considerable interest your report of the meeting of the Royal Society of Medicine on Nov. 6, and we wish to make some remarks on the treatment of burns based on our observations in H.M. ships and a naval hospital.

Immediate treatment.—In men-of-war facilities for treatment are limited even after an action, and shock can be treated only by general measures and morphia. Plasma and reconstituted-serum transfusions are not always possible, and in hospital ships and hospital carriers are only possible in very limited numbers. In fighting ships treatment is essentially first-aid, and must be simple, easily and rapidly applied, preferably directly to the affected area without cleansing, and as painless as possible. This is best met by using jelly or mucilage preparations containing an antiseptic and analgesic. It is most important that the marginal skin for a considerable distance around should be treated with an antiseptic dye, either "coagulant" preparation or a simple mucilage containing gentian-violet (0·1%) and brilliant green (0·1%). Our bacteriological work on burns from naval casualties has shown that the staphylococcus and not the streptococcus is the prevalent pyogenic organism. Infection occurs mainly from the marginal skin or proximate garment, and much less frequently from the mouth and fauces of the patient or attendants. Infection is minimised by adequate and repeated marginal painting and by dressings covering completely the area involved.

The use of tannic acid.—We consider that tannic acid is an effective method of treatment, if intelligently used. It is easily applied, for example, in 20% strength in a glycerin-jelly base; with this concentration coagulation occurs readily without the use of hair-dryers. Tanning is no small factor in saving the life of the patient where large areas are involved. It can be applied to extensive surfaces, being interrupted by narrow transverse sterile Vaseline strips at joints. The most important factor in this connexion is that the initial tanning should be adequate. Often a 5% tannic-acid solution or compress has been employed and the resulting tanning has been slow and ineffective; cleansing and re-tanning under anæsthesia has then been necessary on the case reaching hospital. Our experience has been different from that of Surgeon Rear-Admiral Wakeley, who found the tan loosened on the eighth or ninth day, leaving a healed scar. Not infrequently in uncomplicated cases the tan has remained for as long as 4 or 5 weeks before separating completely.

Infected cases.—In infected cases, sulphanilamide or sulphapyridine, given by mouth when possible, in doses amounting to 20 g. over a period of 4 days, is most helpful in conjunction with hypertonic sodium sulphate applications. The temperature settles, the area becomes clean, the purulent exudate is diminished considerably and "coccus-free" some days earlier than when similar local measures are adopted but the drug withheld. We have used sulphapyridine and sulphathiazole locally in a few cases of infected wounds, but not in infected burns. If the requisite concentration of these compounds in the blood is obtained and maintained for the time necessary, a similar concentration will be present in the exudations in the infected area; this will be more effective than surface (depot) applications of crystals as such or in suspension, because the solubility of the compounds is relatively slight. Some months ago we saw several infected cases which were cleansed and re-tanned; the majority of these did well, the tan loosening between 2 and 3 weeks later, leaving healed skin. Marginal painting with antiseptic dyes prevented recurrence of sepsis. In some cases in which this was not done infection recurred at the margins; in a few this was slight, and the condition later cleared up after adequate drainage. In others the areas had to be cleansed again and re-tanned. In certain cases the granulating areas were treated with tulle-gras. In these, a certain degree of infection occurred and fairly frequent changing of dressings was necessary. This was a painful procedure, and required repeated Pentothal anæsthesia. The pus accumulated in the meshes of the tulle-gras. The most severe of these cases were cleansed and re-tanned, silver nitrate being used as the antiseptic; these later did well. In all of these cases the organism recovered was *Staphylococcus pyogenes aureus*. A number had been treated with cod-liver oil and these readily became infected. *Bacillus pyocyaneus* and *B. proteus* were commonly found in addition, and these were responsible for much unpleasantness. Despite this combined infection, however, with no other measure than exposure to the air, and repeated changing of the topmost dressings, the exudation dried up and the infection was self-terminated. The dry pus-encrusted dressings which had acted as a tan separated and left good, well-healed, scar-free areas.

Following the report by Russell and Falconer on the buffered isotonic proflavine-sulphate solution to be used in head injuries, we prepared this solution, added urea (5%) and incorporated it in a base similar to that of the B.P. acriflavine emulsion, but with the composition of the base so arranged as to permit of the ready diffusion of the water phase; 30% of the antiseptic dye was available in a period of 24 hours when tested against plasma and serum under standard conditions. This was applied to the granulating areas of infected burns after removal of the tan and treatment with hypertonic sodium-sulphate solutions. The emulsion dressing was left undisturbed for 8 days, when it was renewed. Occasional exuberant granulations were "burned" with blue-stone and the dressing reapplied. Reinfection with pyogenic cocci did not occur in cases so treated—*B. pyocyaneus* was the only organism occasionally recovered, but this did not appear to interfere with the rate of repair. In a series of cases so treated we have had very good results. The granulating areas were measured and the rate of healing established. The best results were obtained in relatively superficial burns which had become infected and were granulating; the rate was remarkable, and in one case previously healing very slowly an area the size of a sheet of foolscap paper healed in 14 days (5 sq. mm. per mm. circumference per day). The average rate in all cases has been less, the slowest being about a tenth as fast. This occlusive emollient dressing yields an adequate amount of bland, effective antiseptic in an ideal, buffered isotonic solution. It is painless and easy to remove and

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apply; it can replace re-tanning and allows fairly free movements of joints. The healed skin is in good condition, and as far as we are aware no keloids have been noted in our cases (earliest treated 8 months ago).

We have not had an opportunity of seeing cases treated by saline baths or tulle-gras and saline packs prior to grafting, as described by Mr. McIndoe. We judge that this treatment cannot be generally applicable, demanding as it does considerable trained team-work and the facilities of a well-appointed hospital. The irrigation method using the Bunyan-Stannard oiled-silk envelopes appears to offer results which outweigh the additional facilities required. We consider, however, that the simpler application of hypertonic sodium-sulphate solution, either as such or in a loose oil-water emulsion, with or without the later application of a buffered isotonic proflavine-urea emulsion will render most infected burned areas (third degree) clean and suitable for grafting. In infected second-degree burns the results with this treatment have been consistently good. Cases previously showing slow repair have healed fairly rapidly. We hope to publish some of our results shortly.

J. F. HEGGIE,
Aberdeen. R. M. HEGGIE.

THE PHYSICS OF BLAST

SIR,—As a Londoner I consider that the longitudinal nature of blast-waves is overemphasised; also that any comparison with the sea should surely be made with its bottom rather than its surface. Sandbag walls in front of doors or along area railings may protect from splinters, but will not prevent the doors or basement windows being blown in by blast. Again, the effect of blast on buildings may be to lift the floors rather than to displace the walls. To protect a basement window looking on to an area, the area itself must be filled with sandbags.

London, W.8. N. G. HULBERT.

TOO MUCH VENTILATION

SIR,—In your note on the advice given by the War Office on the management of cerebrospinal fever (Nov. 9, p. 608) you mention that "In particular, medical officers are advised to make sure that whenever rooms are vacated maximum ventilation is obtained." Although this advice is in theory wise, in the coming weeks of wet cold are we not going to be between the Scylla of spray infection and the Charybdis of the contamination of bedding, and especially mattresses, by cold water vapour? After a careful study of the article on the influenza epidemic of January-March, 1939, by Stuart-Harris, Wilson Smith and Andrewes in your issue of Feb. 3 (p. 205) I cannot escape the conclusion that the outbreaks of clinical influenza in schools and barracks which they detailed—they were of explosive origin, yet yielded no virus, and arose 7 days after reassembly following the Christmas holiday—were due to a reaction to "maximum ventilation" itself, and its effects on bedding—doubtless well aired daily during the absence of the occupants. This conclusion receives support from clinical observations in general practice.

Air saturated with moisture and at a temperature of 33°–40° F. may well be irritant to the bronchial mucosa; asthmatics and bronchitics certainly find it so. The symptoms in cases of influenza at the naval barracks at Chatham in 1939 are thus described: "... flushed moist pharynx without exudate, and a persistent irritating barking cough, accompanied by substernal pain, were observed. There were a few cases of severe laryngitis." Against this let me quote from my case-notes. "Lung, 2–3 hours: voice husky, aphonia, cough, pains in chest." My note, however, does not refer to influenza but to the effect of air containing one part of mustard-gas (H) vapour per million acting on the lungs for an hour, and was made at an anti-gas school two years ago. I suggest that unwarmed air in wet, cold weather has something of the same effect. Physicians of the old school knew this well and forbade the young to breathe winter night air. In the England of Dickens, moreover, they had plenty of cheap fuel, warm clothing and strong cordials which we in the England of Priestley lack.

Rochester. A. J. COPELAND.

IMPROVEMENT IN THE MEDICAL SERVICES

SIR,—Before I go into the Army next week and for ever after hold my peace (at least until the war is over) I should like to correct one of Sir Ernest Graham-Little's shrill denunciations of the British Medical Association. So far as London is concerned, the "panicky measures regarding the E.M.S. taken by the Ministry of Health at the outbreak of war" were due to the advice of the sector officers as a body, for it was they and not the Central Emergency Committee of the B.M.A.—indeed the latter committee quite definitely advised against the course—that insisted on consultants being called up for full-time service in E.M.S. hospitals. In the provinces, except for a few whole-time officers, consultants were from the beginning on part-time service with the E.M.S., and in Scotland, where the first air-raids actually occurred, engagements were on a sessional basis, which allowed them to carry on their hospital work, teaching and private practice without interruption. I realise that the sector officers had every right to expect the blitzkrieg on London in September, 1939, instead of having to wait until September, 1940 (when my own contract with the E.M.S., along with others, was terminated by the far-seeing Ministry of Health), and the action they took at the beginning of the war was in intelligent anticipation of intensive bombing. But if Sir Ernest must blame someone for the "panicky measures" he must blame the sector officers—chosen with care before the war by the great teaching hospitals of London, from the ranks of the consultants, for their potential administrative abilities—and not the B.M.A. committee, which was and is unusually representative of all sections of the medical profession and by no means restricted to B.M.A. members.

Harley Street, W.1. R. SCOTT STEVENSON.

RADON SUPPLIES—A REQUEST

SIR,—Owing to increasing hazard in the daily use of radium, there is a big demand for radon. The radon centre at Barton, Beds, which was started a year ago has been working to capacity, although there has been a recent addition to its supply; despite this the medical demand is more than we can at the moment cope with. Plans are being discussed as to the best way of serving these medical needs in the future and it would be of great assistance if those who have to use radon would send me word during the next few days what are likely to be their future requirements per week.

Middlesex Hospital, W.1. SIDNEY RUSS.

PNEUMOTHORAX AND STAPHYLOCOCCAL SEPTICÆMIA

SIR,—In view of the scantiness of reported instances encountered by Mr. Butler and Dr. Perry (*Lancet*, Nov. 16, p. 619) I should like to record another example of pneumothorax complicating staphylococcal septicæmia.

A child of 7 was admitted to hospital with mastoiditis. Schwartze's operation was performed and an extradural abscess drained. Repeated rigors followed. The left lateral sinus was explored, and though it contained no clot a blood-culture was positive. Metastatic abscesses developed despite ligature of the internal jugular vein, and two further blood-cultures both yielded *Staph. aureus*. In the fifth week a left-sided empyema formed and the patient began to succumb slowly to the toxæmia; death occurred suddenly a few days later, and was found post mortem to be due to a large right pneumothorax. The autopsy demonstrated in addition the following points.

The left internal jugular vein contained clot which extended upwards into the sigmoid sinus and downwards through the innominate vein into the superior vena cava. Both lungs contained many septic infarcts, some of which were breaking down; on the left side they had given rise to the empyema, and on the right side to the pneumothorax. There were in addition other metastatic abscesses.

Pathologically, it might be expected that pneumothoraxes would result not infrequently in cases of multiple lung abscesses, for it is not difficult to imagine how a breaking down infarct may simultaneously involve a bronchiole and visceral pleura, despite the surrounding consolidation of the lung and the pleural reaction. One

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must suppose that these two processes effectually prevent the establishment of a communication between bronchioles and pleura in most cases since pneumothorax, apparently, is but rarely met with under these circumstances.

I am indebted to Mr. N. A. Jory for permission to record this case.

Stoke Mandeville, Bucks. C. J. LONGLAND.

MISUSE OF TANNIC ACID

SIR,—It would be interesting to know what has suddenly happened that has brought tannic acid as a treatment for burns into a front line for attack. I have used this method, both in hospital and private practice, for many years, in fact ever since it first came into vogue and have nothing but praise for the results obtained. It has helped to relieve shock, diminish surface loss of fluids, and provided ordinary principles are adopted, such as rest and skin grafting, I see no reason for contractures to occur. I am less fortunate than many, because I am not serving with any of the fighting forces and so have had no opportunity of seeing the class of burn that the present war has produced, especially in the Navy and Air Force; but I have read the discussion that has recently taken place at the Royal Society of Medicine together with most, if not all, the articles that have been published and I note that even though gentian violet or some such dye is often recommended, with or without silver nitrate, in many instances tannic acid has been added in some form or other. Is it not likely that the crippling end-results in fingers are due rather to the severity of the burn caused by the combination of petrol and high explosive than to the application of tannic acid and that provided the tanning is confined to the anterior and posterior surfaces of the fingers, no such crippling effects of the hands should ever occur?

Welshpool. H. G. PINKER.

OLD-FASHIONED DRUGS

SIR,—A note in *Science* of Oct. 25 (p. 373) calls attention to the fact that important changes in medical prescribing in Great Britain are recommended by an official medical committee. Among the drugs said to be "in frequent use," and which are now hard to obtain, are balsam of tolu, buchu leaves, calumba root, black catechu, gelsemium root, jalap and senega root. Many American physicians will no doubt wonder why such antique galenicals and other proprietary medicines are still used by our British colleagues after we have long since abandoned them as lacking in useful pharmacologic effects. It would seem to some of us that if the present war has no other good effects it may at least serve to discard much outmoded therapeusis.

Jefferson Hospital, Philadelphia. HOBART A. REIMANN.

Obituary

ROBERT MAITLAND BEATH

B.A. R.U.I., M.B. BELF. AND LOND., F.F.R.

Dr. R. M. Beath, who died on Nov. 21 at the age of 54, was the son of Mr. Robert Beath of Belfast and was educated there in the Royal Academical Institution and the Queen's University. In 1914 he qualified in medicine, taking first place in the examination, and five years later he obtained the degrees of M.B., B.S. of London University. In the meantime he served with distinction in the last war, retiring with the rank of major. Always interested in physics, he had some radiological experience during the war and continued its study with enthusiasm after demobilisation. His first hospital appointment was as radiologist to the Ulster Hospital for Children and Women and soon afterwards he joined the honorary staff of the Royal Victoria Hospital. Later he became radiologist to the Belfast Infirmary, consulting radiologist to the Forster Green and County Mental hospitals, and lecturer in dental radiology in Queen's University. In 1937 he was chairman of the Belfast division of the B.M.A. and in the following year was elected president of the Faculty of Radiologists, of which he was a foundation fellow; he was also on the council of the British Institute of Radiology. In an extensive private practice he had as partner, since 1924, Dr. Frank Montgomery. He is survived by his widow, daughter of the late Mr. R. M. Young, M.R.I.A., of Belfast, and by four daughters.

Halliday, Belfast

Beath's untimely death, after an illness of a few weeks' duration, has caused widespread sorrow which is not confined to medical circles in Belfast and Ulster. To few men is it given to enjoy so fully the affection and esteem of others. Those who have availed themselves of his help and skill know best how kind he was, how quickly understanding and how gentle. While he never sought office or preferment, his wisdom, patience and consideration for others made them instinctively choose him for positions of honour and trust. In his travels in America and on the continent of Europe he made friends in many countries and nothing gave him greater pleasure than to entertain them in his home. He was an enthusiastic Queensman, interested in every aspect of his university's activities. An original member of its O.T.C., he was, at the time of his death, president of its Services club, and a past master of its masonic lodge. It is, perhaps, only now that he has gone that those who knew him realise to what extent they had come to depend on his wise counsel and unfailing friendship. R. M.

DUNCAN FLETCHER

L.R.C.P.E., D.P.H.

WHEN the *City of Benares* with many children aboard, was torpedoed in mid-Atlantic on Sept. 17, Dr. Fletcher was amongst those who lost their lives. He was a native of the West Highlands, and after qualifying in 1895 most of his work was done there as chief district medical officer for the Islands and Western Inverness county. In 1915 he joined the R.A.M.C. and saw service in Egypt, Gallipoli, and France with the 29th division. He also served at Murthly War Hospital and Ralston War Hospital and as medical superintendent at the Grove Neurological Hospital, Dumfries. He retired in 1919 with the rank of lieutenant-colonel. In 1920 he returned to general practice at Kinross, and four years later settled at Dollar. He went abroad after a severe illness in 1936, and each winter since then he travelled to India as surgeon on one of the City Line steamers. He was on the *City of Benares* when war broke out, and at once volunteered to join the Merchant Navy for the duration of the war. He leaves two sons, one of whom, Dr. R. A. Fletcher, continues his father's practice at Dollar.

Annan, Glasgow

Dr. R. R. Macnicol, a comrade of the last war writes: It was in the Island of Lemnos, at the evacuation of Gallipoli, that I first met Fletcher on his return with the 29th division and found him serving in the very field ambulance to which I had been posted. From that moment till the end of the war I had opportunity of observing his many fine qualities. A strong unassuming character, a fearless devotion to duty, proved themselves in the rigors of the Somme and the Ypres front. Fletcher was always the same placid humorous comrade. An ardent Celt, he was steeped in the lore, the poetry and the music of the Gael, and I cherish memories of his tales, anecdotes and songs which whiled away our waiting hours. I am proud to have been numbered among the friends of that kindly Highland gentleman who died at his post at the hands of the old enemy, and I take leave to place another stone on his cairn.

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Medical News

University of Wales

At recent degree examinations in obstetrics and gynæcology at the Welsh National School of Medicine the following were successful: G. B. Downs, Eirian Spickett, and G. A. Wright.

Royal College of Nursing

At a meeting of the council of the College on Nov. 21 it was announced that as a practical expression of their concern at the inadequacy of the present shelter services, and in an attempt to overcome the sense of frustration left by visits to authorities, the public-health section of the college had offered to staff two tube-stations in the centre of London. The offer has been accepted by the medical officer of health concerned, and the nurses, who will give their services free, will enter on their duties without delay. Meanwhile the college urgently appeals for more public-health nurses to volunteer for the work at Civil Nursing Reserve rates.

The new short-term war courses for industrial nurses start at the College early in January. These industrial nurses are to be trained as quickly as possible in batches of 30, the Government paying the fees and providing maintenance grants and, in some cases, travelling expenses. In view of the lack of provision for dealing with the great influx of working population to rural areas and the unwillingness of the workers to sacrifice time and pay seeking treatment, the college is urging the establishment of additional medical facilities, supplemented by mobile clinics. The college, while supporting the Midwives Institute's recommendation that women in factories should cease work for four weeks before and eight weeks after the birth of a child, secured approval for the additional recommendation that these weeks should rank for National Health Insurance benefit, without which few women would be induced to forgo their wages.

Medical Casualties

The following casualties in the R.A.M.C. are announced:—

Prisoner of war.—W. S./Captain N. D. Allan, M.B. Aberd.; W.S./Captain S. G. Cowper, M.R.C.S.; Lieutenant B. J. Harries, M.R.C.S.; Lieutenant W. C. Harris, M.B. Glasg.; A/Major C. W. A. Kimbell, F.R.C.S.E.; Lieutenant R. Mackay; Lieutenant Alexander Mcnab, M.B. Glasg.; Lieutenant R. D. Monteith, M.B. Aberd.; Lieutenant J. H. Mulligan, M.B. Aberd.; T./Captain G. S. Trower, M.B. Camb.; Major E. R. C. Walker, M.B. Edin.

The discussion on Active Immunisation at the Section of Therapeutics of the Royal Society of Medicine arranged for Tuesday, Dec. 10th, at 2.30 P.M. has been postponed until Tuesday, Jan. 14th. On Wednesday, Dec. 11th, at 2 P.M., Mr. W. B. Gabriel will give his presidential address to the Section of Proctology. He will speak on Squamous-celled Carcinoma of the Anus and Anal Canal.

At the fifth annual general meeting of the Ethical Pharmaceuticals Association on Nov. 26, Mr. A. W. Edwards, the chairman, commented on the purchase tax. He deprecated the narrow list of essential drugs of exceptionally costly nature and expressed surprise that sales to hospitals were not exempted from the tax.

The following officers were elected for 1940–41: chairman, Mr. A. W. Edwards; vice-chairman, Mr. H. R. Napp; hon. treasurer, Mr. J. C. Gordon; secretary, Mr. F. G. W. Paige; members of executive committee, Mr. J. Angus (Bengue and Co.), Mr. W. Beckley (Chas. Zimmermann and Co.), Mr. A. C. Henry (Bayer Products), Mr. E. H. Spicer (Endocrines-Spicer), and Mr. C. W. S. Taylor (Ciba).

At a meeting of the Pharmaceutical Society on Dec. 11 at 2.30 P.M., at 17, Bloomsbury Square, London, W.C.1, Mr. A. L. Bacharach, F.I.C., will speak on some nutritional problems of war and peace.

Lectures and practical courses of instruction for a diploma in psychological medicine will be held in connexion with the Maudsley Hospital at the beginning of 1941. Attention will be given to the social aspects of psychiatry and to wartime problems. Further particulars may be had from Prof. S. Nevin, hon. director of the medical school, Central Pathological Laboratory, West Park Hospital, Epsom, Surrey. Applications for admission to the course should be sent to him before Dec. 16.

The Minister of Health has issued a circular to county nursing associations and district nursing associations asking if they will help to look after munition workers and others engaged in work of national importance who have been transferred from their own homes. These workers will mostly be living in billets and lodgings and when they fall ill the skilled services of a district nurse may well be essential. It is suggested that when a worker is absent on account of ill health his factory should notify the nursing association. The Minister will pay not more than 9*d.* for each visit made by a nurse, and the workers will not be required to make any payment though it is hoped that they will contribute what they can towards the expenses of the nursing association.

Sir Cuthbert Wallace, Mr. E. Rock Carling, Mr. G. R. Girdlestone, and Sir Frank Colyer have been appointed honorary consultants to the Ministry of Pensions.

Dr. W. Russell Thomas (Liberal National) has been returned unopposed as member of parliament for Southampton in the by-election caused by the elevation of Sir John Reith to the peerage.

The O.B.E. has been awarded for good services with the Somaliland force to Surgeon Lieut.-Commander W. M. Macgregor, M.B. Camb., R.N.V.R.

Infectious Disease in England and Wales

DURING THE WEEK ENDED NOV. 2, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1789; whooping-cough, 1740; diphtheria, 1282; enteric fever, 28; measles (excluding rubella) 12,572; pneumonia (primary or influenzal), 572; puerperal pyrexia, 120; cerebrospinal fever, 132; poliomyelitis, 34; polio-encephalitis, 5; encephalitis lethargica, 3; dysentery, 81; ophthalmia neonatorum, 76. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 8 was 1557, including: scarlet fever, 284; diphtheria, 255; measles, 464; whooping-cough, 45; enteritis, 45; chicken-pox, 192; erysipelas, 41; mumps, 21; poliomyelitis, 1; dysentery, 3; cerebrospinal fever, 22; puerperal sepsis, 8; enteric fevers, 13; other diseases (non-infectious), 72; not yet diagnosed, 87.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 2 (0) from enteric fever, 2 (0) from scarlet fever, 14 (2) from whooping-cough, 25 (0) from measles, 33 (1) from diphtheria, 43 (6) from diarrhœa and enteritis under 2 years, and 20 (4) from influenza. The figures in parentheses are those for London itself.

At Liverpool there were 17 deaths from measles, 6 from diphtheria, and 9 from diarrhœa. Birmingham reported 4 deaths from whooping-cough and 3 from diphtheria.

The number of stillbirths notified during the week was 219 (corresponding to a rate of 44 per thousand total births), including 24 in London.

Births, Marriages and Deaths

BIRTHS

BARLOW.—On Nov. 25, at Crapstone, Yelverton, the wife of Surgeon Commander Noel Barlow, R.N.—a daughter.

GASTER.—On Nov. 25, at Milton Abbas, Dorset, the wife of Dr. M. R. Gaster—a son.

MITCHELL.—On Nov. 25, at Gerrards Cross, Bucks, the wife of Dr. S. D. Mitchell—a daughter.

MELLER.—On Nov. 30, at Prestbury, Cheshire, the wife of Captain H. K. Meller, R.A.M.C.—a son.

ROBINSON.—On Nov. 25, at Sydney, Australia, the wife of Dr. Allan Robinson, of Slough, Bucks—a son.

STEPHENS.—On Nov. 30, at Gwelo, S. Rhodesia, the wife of Dr. T. W. Stephens—a son.

MARRIAGES

TARGETT—HILLMAN.—On Nov. 20, at St. Andrews, Ham Common, Surrey, Walter Kendell Targett, M.R.C.S., to Eveline Hillman.

DEATHS

BOX.—On Nov. 27, at Scaynes Hill, Sussex, Stanley Longhurst Box, M.D. Lond., aged 68.

COWIE.—On Nov. 25, at Woodmancote, Sussex, Charles George Cowie, M.D. Aberd.

GAYER.—On Nov. 29, at Tetbury Hospital, Reginald Courtenay Gayer, M.R.C.S., of Hans Crescent, S.W.1.

HAVILAND.—On Nov. 30, Frank Papillon Haviland, M.D. Camb., M.R.C.P., of St. Leonards-on-Sea.

LOCK.—On Nov. 29, John Lewis Lock, M.B. Camb., of Chiswick.

TOWNSEND.—On Nov. 29, at Hammersmith, Meredith Milton Townsend, L.R.C.P.E.

WEBSTER.—On Dec. 1, in London, William Leckie Webster, M.B. Edin., Colonel, late R.A.M.C.

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Notes, Comments and Abstracts

NURSES' VIEW OF THE NURSE ANÆSTHETIST

THE council of the Royal College of Nursing, having sought the opinion of the various professional bodies interested, has agreed not to support the policy of training nurses as anæsthetists. They are of the opinion that the administration of anæsthetics should be regarded as a special branch of medicine and should be left in the hands of the medical profession. The council associate themselves with the opinion of Prof. R. R. Macintosh, who agrees that an intelligent nurse can become technically very skilful in the administration of anæsthetics, as is in fact the case in America, where anæsthetics are regularly administered by nurses under medical supervision, but he is emphatic that only the specialist proper has a training broad enough to deal with all the diverse types of modern anæsthesia, and to control unexpected complications. The council were further strengthened in their contention by the fact that there is no dearth of men or women medical anæsthetists in this country. On the other hand, however, they felt bound to take the following facts into consideration: Nurses in this country have to take some sort of course in anæsthetics to prepare themselves for the mission-field; midwives are now allowed to give anæsthetics under medical supervision with strict safeguards; there are innumerable occasions in war-time when the nurse must assist the doctor by giving the anæsthetic when he is operating on a casualty single-handed. To meet such needs and to regularise training in the mere administration of anæsthetics, the college recommend that suitable courses of training should be available for nurses who were required to administer anæsthetics under medical supervision in an emergency. Such courses, however, would in no way qualify nurses as anæsthetists, since the actual choice of anæsthetic would depend on the patient's physical state and would be determined by the medical man in charge.

TREATMENT OF BURNS

AT a meeting of the Shaftesbury Military Hospital Medical Society on Nov. 5, with Major-General F. Casement in the chair, a discussion on the treatment of burns was opened by Brigadier P. H. Mitchiner. Deaths were due, he said, to shock, sepsis, and delayed shock. Despite the views of Professor Wilson of Edinburgh he did not believe that delayed shock was a great danger, but perhaps this was because tannic acid was used in weaker solutions south of the border. Transfusions should be given when practicable; otherwise simple and effective treatment consisted in keeping the patient warm, giving him morphia and resting him for half an hour before moving him. All cases should be given sulphanilamide by mouth from the beginning. It was important, indeed necessary, to keep a skilled team for the treatment of burns, and not to let them be at the mercy of all and sundry. The patient should be anæsthetised before treatment; morphia in large doses was preferable to inhalants as the lungs were usually irritated by smoke. The burned area and six inches of surrounding skin should be cleaned, the blebs should be removed and a coagulating solution applied. He preferred 2% tannic acid but 1% gentian violet was probably equally good. It had recently been stated that tannic acid was liable to produce contractures of the fingers, but he thought that in many cases these resulted from necrosis due to the burn, in view of the fact that it was only reported after severe burns. He had not seen necrosis as a result of tannic acid properly and judiciously applied.

Major W. J. O'Donovan had had much experience of post-mortem examinations in cases of burns and said that considerable medico-legal knowledge was required to establish identity from charred remains, especially when many had been killed by factory explosions, particularly those occurring in T.N.T. factories. In solitary cases it was always possible that death might have been due to some other cause, possibly criminal. He had seen burns from a celluloid comb set alight by a hairdresser's drying hood, an ultraviolet-light burn from a lamp used in photography, and burns of the hands from perhydrol. He described cases of dermatitis artefacta in soldiers, one being a buttock repeatedly blistered by sitting on a hot-water pipe, the other a burnt forearm achieved by bandaging on ha'pennies dipped in muriatic acid. He had treated the second case by putting the other hand up in plaster-of-paris.

Dr. Janet Vaughan had been impressed by the mortality from burns in the air-raid cases she had visited with a blood-transfusion unit. In many cases she had been able to get there within 1–2 hours, and thought that with a well-organised unit blood transfusion was a practicable first-aid measure under civilian conditions. Cases to which the unit was not called for 12–24 hours were those which did badly. Burns were the only air-raid casualties in which hæmoconcentration developed, apart from a few cases of traumatic œdema. Blood was more useful than saline but not as good as plasma; but she advised giving plasma for 24 hours only; after that time it might cause œdema. Moreover, a small amount of Merthiolate was added to plasma during its preparation to prevent it becoming infected, and presumably it was not wise to give more mercury than necessary to cases already liable to renal damage. After 24 hours, concentrated serum could be given, and after 72 hours no further transfusions were needed if the case had been properly tanned; but as long as the burned area was oozing transfusion should continue. If only one vein was available a cannula should be tied into it; this ensured control of the fluid intake and made it possible to give glucose continuously. She too laid emphasis on the value of team work, and summarised recent advances in the treatment of burns as immediate and maintained transfusion, and the use of sulphonamides before the onset of infection.

URINE SPECIMENS FROM FEMALE INFANTS

NURSES waste much valuable time in trying to collect specimens of urine from young infants, especially when these are girls. Robert Cohen and M. L. Blatt (*Amer. J. dis. Child.* October, 1940, p. 897) have devised a simple apparatus which the child can wear comfortably, and which can be applied easily by the nurse, doctor or even the lay parent. The collector is made wholly of rubber and consists essentially of a funnel fitting over the vulva and narrowing below to a tube which can be stretched over an ordinary test-tube. The brim of the funnel has a curved ridge or partition along its posterior edge, from which a flat rubber button projects over the perineum; the partition and button together prevent urine from dribbling out or fæces from working into the funnel and contaminating the specimen. The collector is held in place by three rubber straps—one in front and two behind—which are fastened by safety-pins to the child's vest. The rubber is soft and comfortable and causes no irritation; the collector can be left in position until the child urinates and when removed can be sterilised by boiling. It has been given thorough trial in several pædiatric centres and can be used equally successfully on infant boys.

The Minister of Health has sent a circular to sanitary authorities reminding them that one of the commonest causes of the spread of enteric disease is the contamination of food. Everyone engaged in the preparation of food, and especially employees in bakeries and dairies, should therefore carry out the elementary precautions laid down by law. They are required to keep their persons and clothing clean and facilities must be provided for them to wash their hands before beginning their work and after every act of voidance. Persons engaged in these trades, who are found to be suffering from an enteric fever or to be carriers, are of course suspended from their employment.

The Harveian lecture for 1941 will be delivered to the Harveian Society of London by Dr. John Taylor in March. The subject of the lecture will be the coroner, the doctor, and the public.

Appointments

BURTON, J. A. G., M.B. Glasg., F.R.C.S.E., F.R.F.P.S.: medical referee under the Workmen's Compensation Act, 1925, for Glasgow, Lanark, Hamilton, and Airdrie.

DINGLE, PHILLIS, M.D. Lpool, D.R.C.O.G.: asst. M.O. (obstetrical) at the Redhill County Hospital, Surrey.

MACGREGOR, J. F., L.R.C.P.E., D.P.H.: temp. T.O. for Surrey.

ROWBOTHAM, G. F., B.Sc. Manc., F.R.C.S.: neurological surgeon to the Newcastle-on-Tyne General Hospital.

ORIGINAL ARTICLES

A PLEA FOR THE DE-SPECIALISING OF PATHOLOGY[1]

BY G. W. GOODHART, M.D. Camb., M.R.C.P.
PATHOLOGIST IN CHARGE, GROUP LABORATORY, ST. MARY ABBOT'S HOSPITAL, L.C.C.

IN the early days of this century there were two chairs in pathology in London; both were held by men who were primarily physicians on the clinical staff of a hospital. In my own school there was no chair; we were taught morbid anatomy by assistant physicians, morbid histology by an obstetric physician, and bacteriology by an ophthalmic surgeon; but all of them were experts on the subjects they taught. Today there are between 20 and 30 whole-time chairs in pathology and its allied subjects attached to London University, and nowadays when anyone speaks of the pathologist one's thoughts fly at once to the laboratory; the last place where you would look for your pathologist would be in the wards. A peripatetic correspondent[2] writing a few weeks ago, said "Pathologists are like dictators who deal with human material but whose contact with human beings is less than that of the local dustman." A more terrible indictment of modern pathology it would be hard to frame. We are breeding a race of pathologists who regard contact with human beings as a contaminating influence. To these I would recall the name of Lister. We think of him as a monumental figure in surgery, but in fact his gifts to surgery were based on his genius as a pathologist, and I claim Lister as the foremost British pathologist.

* * *

The specialisation of pathology began at the end of the last century under the influence of Virchow and Cohnheim whose master studies in general pathology revolutionised our outlook and opened a new epoch. A further stimulus came from the development of rapid methods of isolating bacteria, a technique that opened the way for the study of immunology. Many problems arising out of this had no immediate relation to clinical medicine; but it was clear that they must be pursued; and so it was realised that pathology was a science which could and must be studied quite apart from its relation to medicine. No-one realises this more fully than I; but I believe that pathologists with this strictly academic outlook should find their opportunity elsewhere than in the schools attached to our undergraduate teaching hospitals. Comparatively few medical students are attracted by it and many are repelled by an approach that seems to them to have no contact with the work which is their main preoccupation. While this specialised pathology was raising its head a number of diagnostic and therapeutic procedures came into being which demanded experience and a technique; the type of work involved was not recognised by the academic pathologists as pathology and the clinicians—by refusing to regard it as medicine—put up a barrier between "clinical" and "laboratory" medicine. For the clinician pathology dwindled to the technical process of cutting up organs in the post-mortem room and demonstrating the final chapter of clinical medicine.

At the end of the war of 1914–18 many new methods of laboratory investigation were discovered, especially in biochemistry, and there was an increased stimulus to general laboratory investigation in clinical work; there was also a great urge towards research. I do not think most of us had any precise ideas as to what we meant by research, but it was the fashion to worship at its shrine. We should have realised that what was really wanted was a return to the study of pathology as understood in an earlier day; instead we mixed it up with laboratory investigations, for which, of course, the senior men had neither time nor inclination; and so we started to build anew, and the units came to birth. The admirable memorandum by Sir George Newman, which may well be called the units' charter, shows that the two main functions of the units were to be teaching and research. These two functions were held to be imcompatible with private practice and so whole-time service was enforced. I am in accord with the provision of full-time posts in clinical medicine, but I refuse to accept the proposition that private practice is incompatible with energy in research and a stimulating influence as a teacher. That the units have had a considerable measure of success has been happily proven; but they have clearly not worked out quite as was intended, and from one quarter we have had the statement that if the unit is to undertake research it must be relieved of teaching. When the idolatry of research has given way to the simple study of pathology we shall expect less from the units but shall get more from them. Now, on top of the units, we have constructed yet another department known as clinical science. What we really want is not division but unification, and I believe we can get it if we go back to the old idea of pathology. Sir Thomas Lewis has done this in part in his development of clinical science; but just as the pathologists had at first to exaggerate the claims of academic pathology in order to get their status recognised, so Sir Thomas Lewis has to my mind had to stress unduly the clinical nature of his work, and there are already signs of a widening of the field here. In fact Lewis originally suggested that clinical pathology would have been a suitable name for his new department if the clinical pathologist had not hedged himself round with test-tubes and needles; in this he was mistaken, for it is the clinician and not the pathologist who has built up the imaginary hedge. I have never understood why Lewis was not content with the old name "pathology"—unadorned by any epithet unless it be that long-forgotten one "human"—for that describes fairly accurately what clinical science is; and just as I have claimed Lister as the outstanding figure among pathologists of an earlier age, so I claim Lewis as pre-eminent among our pathologists today.

* * *

If I ask what is meant by "clinical," I usually get the answer: "At the bedside." Thus a clinical observation is one made at the bedside; a clinical lecture is one where the patient is present and a local demonstration of the points is made. "Clinical" thus used is merely an adjective of place and a blood-count or a bacterial agglutination test become something quite distinct and are contrasted as "laboratory" investigations. Is there any sense in using clinical in this way? A blood-count, a blood-sugar estimation, a Widal test might all be done at the bedside if there were any advantage in it; it happens that they can be done more conveniently and probably with greater accuracy in a laboratory but the information that they give is of precisely the same order as that obtained by inspection, percussion and auscultation. They give us simple facts about the patient we are investigating. A somewhat more complex laboratory investigation such as the Price-Jones method for measuring the diameter of red blood-cells could not by any stretch of imagination be called a clinical observation if that means one made at the bedside. Price-Jones established the normal average diameter of red cells and compared his figures with those obtained from patients with pernicious anæmia, thus showing that the red cells of patients with this disease had a larger average diameter than those of healthy people. All this was purely academic work, but while Price-Jones was engaged on it I used to get him to make me a curve of the diameters in some particular case, and the facts thus elicited were often a deciding factor in making a clinical diagnosis; here the Price-Jones curve had established itself as a clinical observation. On this basis the word clinical describes not the place where the investigation is made but the purpose that is in view in making it; if it is made for the ordinary purposes of clinical medicine it is a clinical investigation.

* * *

I have always been impatient of any attempt to separate the art and the science of medicine. I cannot

1. Being extracts from a presidential address to the Medical Society of London on Oct 14, 1940, entitled Stray Thoughts on Pathology and Medicine.
2. *Lancet*, Aug. 10, 1940, p. 173.

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conceive of any intelligent person engaging himself in the art of medicine without bringing to it scientific method, and anyone who does that cannot be regarded as neglecting the science of medicine. For some reason that I have never fathomed the "scientists" are always regarded as cleverer people than the "artists." I refuse to be a party to any such distinction. I do indeed divide people up into two groups—the clinicians and the academicians—but there is no question whatever of any superiority of the one over the other. In clinical medicine we study the patient; in academic medicine we study the disease. In both we use the scientific method; we collect by accurate observation all the facts we can which bear upon our problem, arrange them in an orderly fashion and make logical deductions therefrom. In clinical medicine the facts we collect are often insufficient to enable us to draw certain conclusion; but if we recognise this fact it does not make our study unscientific. In academic medicine we can choose our problem and we usually reject those which do not give us a reasonable hope of getting an answer. In clinical medicine we cannot choose our problem, we have to tackle all that are presented to us; we proceed along scientific lines and when our data are insufficient to provide us with a sure solution we may hope that experience and wise judgment, wherein lies art, may help us to bridge the gap and make a good guess. If we accept this interpretation of the word "clinical," and the distinction between clinical and academic medicine, the two branches will form a harmonious whole, the one being the complement of the other. The clinician in the pursuit of his own problems will inevitably be led from time to time to wander along academic bypaths, and the academician cannot altogether be freed from clinical contacts. Units will differ only from other teaching firms in the fact that they are staffed by those who prefer whole-time posts and in certain special opportunities arising therefrom, and they may be appropriately established on both clinical and academic lines. In general it may be said that it is much easier to staff a clinical than an academic unit, and that the latter should rarely be a permanent part of the organisation of an undergraduate school.

* * *

How is the clinician to surmount the difficulty presented by the complexity of modern pathological investigation and combine pathological study with adequate clinical experience? He may limit his clinical activities to one small domain of medicine and master the ancillary sciences that pertain thereto, a course adopted by some with conspicuous success; but it is open to comparatively few unless specialisation is to be carried to a dangerous degree. The alternative is coöperation between ward and laboratory, but the coöperation must be a real one between equal partners. There must be no hedges round the laboratory, nor must it be regarded as a place where technological procedures are carried out at the order of the clinician. The laboratory partner must be perfectly at home at the bedside and fully qualified to share in the problems investigated there. There is no reason why some clinical problems should not be initiated and supervised by the laboratory workers; indeed, many investigations would be more speedily and efficiently carried out if laboratory workers were to have charge of beds. Those who may deem this a revolutionary measure have not yet appreciated the proper rôle of the laboratory in clinical medicine. As I see it, this would be a step towards resuming the old tradition that pathology is and must remain the rock on which the house of medicine is built.

WAR-TIME PSYCHIATRY AND ECONOMY IN MAN-POWER

By DESMOND CURRAN, M.B. Camb., F.R.C.P., D.P.M.
TEMPORARY SURGEON-CAPTAIN, R.N.V.R.; CONSULTANT IN PSYCHOLOGICAL MEDICINE TO THE ROYAL NAVY; PSYCHIATRIST TO ST. GEORGE'S HOSPITAL, LONDON; AND

W. P. MALLINSON, B.M. Oxfd, M.R.C.P.
TEMPORARY SURGEON LIEUT.-COMMANDER, R.N.V.R.; NEUROPSYCHIATRIC SPECIALIST; LATE ASSISTANT MEDICAL OFFICER AT THE MAUDSLEY HOSPITAL

ECONOMICAL use of man-power is increasingly important. Psychiatrists have to ensure as far as possible that men liable to break down or to prove ineffective should not be accepted as recruits, and that those who have broken down, have proved incompetent or have not been accepted should be placed in positions suited to their capacity. Many who are unable to cope with life in the fighting services can contribute to the national effort in other ways, and work of this kind is for many the best treatment.

This investigation is based on the analysis of 100 patients admitted to the neuropsychiatric unit of a Royal Naval auxiliary hospital, using 50 patients from the surgical division as controls. It was hoped that a study of the treatment and disposal of these cases would be useful in dealing with the large numbers of such "casualties" which may be expected. In the last war the number of psychiatric cases in the Navy alone was estimated at 20,000 (Beaton).

SELECTION OF CASES

The 100 psychiatric cases were those which first came to hand when going through the records of the neuropsychiatric patients admitted after December, 1938, excluding epileptics, purely neurological cases and those admitted for head injury. The hospital population is not absolutely representative of cases seen in naval psychiatry; there were few cases of certifiable psychosis, most of the milder cases had returned to duty without reaching us, and many men in the series had been admitted because they had not responded rapidly to treatment elsewhere. Thus certain of our patients had become hospitalised before admission, and our results were less satisfactory than those at the other naval neuropsychiatric units where there is opportunity to treat cases earlier.

The 50 surgical cases used as controls were chosen at random, the only criterion being that they should be able to walk so that they could be interviewed privately. When the purpose of the investigation was explained to them they appeared to coöperate fully and to give an honest account of themselves with the exception of one man (case 31), who had been educated at a public school, had worked in a beauty-parlour and as a dress-designer, and who said he was an artist in civilian life; he was arch and coy and possibly untruthful.

TREATMENT

By June, 1940, when the analysis was completed, treatment did not differ in essentials from that of any modern psychiatric clinic; but during the earlier period when these patients were in hospital facilities for treatment were not fully developed and were less satisfactory. Each medical officer had to look after about 30 beds; there was a fairly rapid turnover, but full records were kept. The patients with a few exceptions were known personally to one or both of us. Except in special circumstances patients did not stay longer than three months, and many were in hospital for a much shorter time. It was only permissible to retain a patient in hospital if there was a "reasonable prospect" of an ultimate return to full duty, possibly preceded by a period of shore duty. As soon as possible after it had been decided to invalid a patient he had to be discharged.

GROUPING OF CASES

The 100 psychiatric cases consisted of: active-service ratings 46%; reservists 31%; recruits 25% (table I). Among the controls the comparable figures were: active-service ratings 26%; reservists 28%; recruits 46% (table II). Recruits included men called up for national service and volunteers from the merchant navy and fishing fleet; they are indicated in the tables by the symbol HO (hostilities only). Enemy action had been experienced by 40% of the controls in the form of bombing, mining, torpedoing or immersion (indicated in the tables by W); several of them had been admitted to hospital for wounds. Only 26% of the psychiatric cases had experienced enemy action.

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Cases were tabulated under twelve diagnostic headings:

Anxiety state (A).—Mental manifestations of fear accompanied by one or more of the characteristic physical signs (e.g., sweating, tachycardia, fine tremor).

Hysterical state (H).—The escape element predominating not necessarily in the form of classical conversion symptoms.

Anxiety and hysterical state (AH).—Escape mechanisms and anxiety symptoms coexisting.

Endogenous depression (ED).—The illness might or might not appear to have been precipitated by physical or psychological stress, but showed, in addition to depression, one or all of the following: retardation, self-reproach, ideas of reference and continuous depersonalisation.

Reactive depression (RD).—The primary complaint was of depression, and the illness appeared to depend on a traumatic experience with which the patient was preoccupied; but none of the quartette of endogenous symptoms given above were present.

Psychopathic personality (PP).—A life-long history of maladjustment, shown by a bad work record or repeated antisocial acts, the patient coming under observation because these characteristics had persisted or increased.

Organic states (OS).—Organic factors, such as arteriosclerosis, neurosyphilis or influenza, appeared to be ætiologically significant.

Obsessional state (OB). *Hypochondriasis* (HYP). *Manic state* (MS). *Enuresis* (E).

Mixed state (MIX).—Overactivity and exaltation combined with a depressive content.

The type of reaction most commonly encountered was a mixture of anxiety and depression, and the allocation of many cases under one heading or the other was arbitrary. The staunchest supporter of the view that there is a distinction between neuroses and psychoses would have agreed that this group at least were members of a continuous series. If the reactive as well as the endogenous depressions be labelled psychoses, there were 43 cases of

TABLE I—PSYCHIATRIC CASES

No.	Diagnosis	Rating	Length of service (yrs.)	Age	Factors					Disposal (actual)
					FH	PH	P	Phy		
		Battleship								
1	RD	Boy	1	17	–	–	+	+	..	Inval
2	AH	A.B.	5	25	–	–	–	–	W	,,
3	A	Sto.	2	21	+	–	–	–	W	Duty
4	AH	Boy	1	17	+	–	–	–	W	,,
		Cruiser								
5	H	L/Sig. R.F.R.	5	42	–	–	+	–	W	Inval
6	ED	S.B. C.P.O.	19	37	–	+	+	–	W	,,
7	ED	C.E.R.A.	Pens.	44	+	–	–	+	..	,,
8	A	O/Cook	10	28	–	–	–	–	W	,,
9	H	M.A.A.	22	39	+	+	+	–	W	,,
10	ED	A.B.	20	36	–	+	–	–	W	,,
11	A	C. Sto.	Pens.	45	+	+	–	–	..	,,
12	ED	Sto. P.O.	Pens.	46	–	+	–	+	..	,,
13	PP	A.B.	13	29	+	–	–	–	..	Duty
14	RD	A.B. R.N.R.	—	29	+	–	–	–	..	Inval
15	ED	Sto. R.F.R.	12	32	+	+	+	–	..	,,
16	A	Marine	3	20	–	–	–	–	W	Duty
17	ED	E.R.A.	1½	26	–	–	+	–	..	Inval
18	H	O/Sea.	1½	18	+	–	+	+	..	,,
19	A	L/Sea. R.F.R.	12	39	+	–	+	–	..	,,
20	A	L/Sto.	Pens.	45	–	–	–	+	..	,,
21	A	E.R.A.	H.O.	29	+	+	+	–	..	Duty
22	MS	A.B.	H.O.	28	–	–	–	–	W	Inval
23	H	Writer	1	21	–	–	+	–	..	,,
24	ED	C.E.R.A.	Pens.	46	–	–	–	–	W	Duty
		Destroyer								
25	ED	A.B.	14	28	–	–	–	–	..	Duty
26	ED	A.B. R.F.R.	10	44	–	–	+	–	..	Inval
27	ED	A.B.	23	39	–	–	–	–	..	,,
28	ED	A.B.	24	40	–	–	–	–	..	,,
29	AD	Sto. P.O.	22	39	+	–	–	–	W	,,
30	AH	Sto. R.F.R.	5	40	–	–	–	–	W	Duty
31	ED	A.B. R.F.R.	5	44	–	–	–	–	..	Inval
32	A	L/Sto.	2	47	+	–	–	–	..	Duty
33	ED	A.B.	16	28	+	+	–	–	..	Inval
34	ED	Sto. R.F.R.	6	45	+	+	+	–	..	,,
35	H	Sto.	H.O.	20	–	+	+	+	..	Duty
36	RD	Sto.	1	22	–	–	–	–	W	Inval
37	OS	Sto. R.F.R.	5	43	–	–	–	+	..	,,
38	ED	A.B. R.F.R.	5	37	+	+	+	–	..	,,
39	A	A.B. R.F.R.	16	39	+	–	–	–	..	Duty
40	AH	Sto.	20	35	+	–	–	–	W	Inval
41	RD	O/Artif.	H.O.	22	–	–	–	–	..	,,
42	A	O/Sea.	1½	19	–	–	–	–	W	Duty
43	A	Sto.	3½	21	+	–	+	–	W	Inval
44	PP	O/Sea.	H.O.	20	+	+	+	–	..	,,
		Armed Merchant Cruiser								
45	A	Marine	Pens.	41	–	–	–	–	W	Duty
46	ED	A.B.	Pens.	47	+	–	+	–	W	Inval
47	RD	Sto. R.F.R.	2	40	+	–	–	–	W	,,
48	RD	Lt.-Cdr. R.N.R.	—	52	–	–	–	+	..	Duty
49	PP	L/Sea. R.N.R.	—	37	+	+	+	–	..	Inval
50	E	A.B. R.F.R.	5	42	–	+	–	–	W	Duty
		Trawlers and Minesweepers								
51	E	L/Sea.	Pens.	41	+	–	–	–	..	Inval
52	E	Sto.	H.O.	38	–	–	–	–	..	,,
53	A	Sto. R.N.R.	—	23	–	+	–	+	..	,,
54	H	A.B.	H.O.	40	–	+	+	–	..	,,
55	H	Sto. R.N.R.	—	34	–	+	–	–	..	,,
56	ED	O/Sea. R.N.R.	—	25	–	–	–	–	..	,,
57	ED	O/Sea. R.N.R.	—	19	+	–	–	–	..	Duty
58	PP	Sto.	7	25	–	+	+	–	..	,,
59	A	A.B.	22	39	–	–	–	–	W	,,
60	ED	A.B.	Pens.	42	–	–	–	–	..	Inval
61	A	Greaser R.N.R.	—	30	–	–	–	–	..	Duty
62	H	E.R.A.	Pens.	45	–	–	–	+	..	Inval
63	ED	C.E.R.A.	Pens.	41	+	+	–	–	..	Duty
		Shore Establishment								
64	ED	Yeo. Sig.	11	27	+	–	–	–	..	Inval
65	A	A.B.	13	28	+	+	+	–	..	,,
66	RD	O/Sea.	H.O.	21	+	+	+	–	..	,,
67	RD	C.P.O. Tel.	Pens.	45	–	+	+	–	..	Duty
68	ED	Cook	H.O.	25	+	–	+	–	..	,,
69	PP	O/Tel.	4/12	18	–	–	+	–	..	Inval
70	A	L.S.B.A.	5½	28	–	+	+	–	..	,,
71	PP	L/Std.	14	32	–	+	+	–	..	Duty
72	H	L/Std.	19	41	+	+	+	–	W	Inval
73	Hyp	Lt. Cdr. R.N.V.R.	—	41	–	–	+	–	..	Duty
74	OS	Sgt. R.M.	Pens.	51	–	–	–	+	..	Inval
75	OS	E.R.A.	Pens.	48	–	–	–	+	..	,,
76	RD	E.R.A. R.N.R.	—	28	+	–	+	–	..	,,
77	OS	Sig. R.F.R.	12	39	–	–	–	+	..	,,
78	RO	Yeo. Sig.	11	27	–	–	–	–	..	,,
79	Ob	Boy	2	17	–	–	+	–	..	Duty
80	R	Boy	6/12	16	+	+	–	–	..	Inval
81	H	Sto.	H.O.	25	–	+	+	–	..	,,
82	PP	P.O./Std.	18	38	+	+	+	–	..	,,
		Depot Ship								
83	AH	Boy	5/12	17	+	+	+	–	W	Inval
84	AH	Shipwright	9½	25	+	–	+	–	..	Duty
85	H	O/Cook	4	22	+	–	–	–	..	,,
86	A	L/Sto.	17½	41	+	–	+	–	..	,,
		Submarine								
87	A	A.B.	11	26	–	–	–	–	..	Duty
88	ED	P.O.	13	29	+	–	–	+	..	,,
		Aircraft Carrier								
89	AH	O/Sig.	H.O.	22	–	–	+	–	W	Duty
		Escort Vessels								
90	OS	P.O. Std.	22½	47	–	–	–	+	W	Duty
91	ED	Sto.	16	35	–	–	–	–	..	Inval
92	H	Sto. P.O.	15	33	–	–	–	–	..	,,
		Sloops, Yachts, &c.								
93	ED	P.O. Std.	19	34	+	+	+	+	..	Inval
94	ED	A.B.	22	37	+	–	–	–	..	,,
95	PP	Tel. R.N.W.V.R.	—	35	–	–	+	–	..	,,
96	H	A.B., R.F.R.	12	33	+	+	–	+	..	Duty
97	ED	Sig. R.N.V.R.	H.O.	23	+	–	–	–	..	Inval
98	Mix.	Skipper R.N.R.	—	39	–	–	–	–	..	,,
99	ED	C.P.O. Writer	Pens.	45	+	+	–	–	..	,,
100	RD	Sto. R.F.R.	1½	40	+	–	–	–	..	,,

A, anxiety state.
AH, anxiety and hysterical state.
E, enuresis.
ED, endogenous depression.
FH, family history of nervous instability.
H, hysterical state.
HO, hostilities only.
Hyp, hypochondriasis.
Inval, invalided from the service.
Mix, mixed state.
MS, manic state.
Ob, obsessional state.
OS, organic states.
P, personality.
Pens, pensioner.
PH, past history of nervous instability.
Phy, physical factors.
PP, psychopathic personality.
RD, reactive depression.
W, exposed to direct effects of enemy action.

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TABLE II—SURGICAL CONTROL CASES

No.	Diagnosis	Rating	Length of service (yrs.)	Age	Factors FH	PH	P	Phy	
		Battleship							
1	Amput. of toes	Marine	3	20	—	—	—	—	?W
		Cruiser							
2	Cartilage op.	L/Sea.	14	28	+	—	—	—	W
3	P.U.O.	Boy	8/12	17	—	—	—	—	W
4	Hernia	Corp. Mar. Res.	13	33	—	+	—	—	**
5	Lac. arm and fracs.	A.B. R.F.R.	14	39	—	—	—	—	W
6	Frac. ankle	L/Sea.	10	28	—	—	—	—	W
		Destroyer							
7	Hydronephrosis	L/Sea.	16	31	—	—	—	—	..
8	Shrap. wounds	A.B.	Pens.	41	—	—	—	—	W
9	Piles	A.B.	16	31	—	—	—	—	W
10	Cystitis	O/Sea.	H.O.	20	—	—	+	—	W†
11	Rectal polyp.	O/Sig. R.N.V.R.	—	22	—	—	+	—	†
12	Shrap. wounds with fracture	A.B. R.N.R.	13	32	—	—	—	—	W
13	Shrap. wounds	O/Sea. R.N.V.R.	9/12	20	—	—	—	—	W
14	Shrap. wounds	A.B.	2¼	20	—	—	—	—	W
15	Scalds	Sto. R.F.R.	5	40	—	—	—	—	W
16	Knee injury	A.B.	7	25	—	—	—	—	W
17	Balanitis	Sto. 1st cl.	1	20	—	—	—	—	..
		Armed Merchant Cruiser							
18	Perm. colostomy	LS/Sto.	Pens.	42	—	—	—	—	..
		Trawler and Minesweeper							
19	Adenitis	A.B.	9/12	28	—	—	—	—	..
20	Piles	Engineman R.N.R.	—	36	+	—	+	+	†
21	Hernia	L/Sea. R.N.R.	—	28	—	—	—	—	W
		Shore Establishment							
22	Appendicitis	Stoker	H.O.	20	—	—	—	—	..
23	Motor accident	A.B.	Pens.	25	—	—	—	—	W
24	Osteomyelitis	Marine	H.O.	20	—	—	—	—	..
25	,,	Boy	9/12	17½	—	—	—	—	..
26	Hernia	C/Shipwt.	Pens.	55	—	—	—	—	..
27	Warts	Gun-layer R.N.R.	—	24	—	+	—	+	W*
28	Epididymitis	Stoker R.N.R.	—	37	—	—	—	—	..
29	Cholecystitis	Sgt. Mar.	Pens.	48	—	—	—	—	†
30	,,	Sgt. Mar.	Pens.	48	—	+	+	+	†
31	Inj. cartilage	O/Sea.	H.O.	23	—	—	—	—	..
32	Knee injury	O/Sea.	H.O.	20	—	—	—	—	..
33	Varicose veins	O/Sea.	H.O.	24	+	—	+	—	..
34	Thrombosis leg veins	O/Sea.	H.O.	20	—	—	—	—	..
35	Anal warts	S.B.A.	H.O.	25	—	—	—	—	..
36	Hernia	Marine (Band)	H.O.	24	—	—	—	—	..
37	Cartilage inj.	O/Sea.	H.O.	20	—	—	—	—	..
38	Piles	Stoker R.N.R.	—	45	—	—	—	—	..
39	Cartilage inj.	O/Tel.	H.O.	21	—	—	—	—	..
40	Varicose veins	O/Sea.	H.O.	22	+	—	—	—	..
41	Hernia	C.P.O.	Pens.	54	—	—	—	—	..
		Depot Ship and Ammunition Carrier							
42	Phlebitis	C.E.A.	12	29	—	—	—	—	..
43	Hernia	C.P.O.	Pens.	40	—	—	—	—	..
		Contraband Control, Sloop, Yachts, &c.							
44	Hernia	L/Sea.	Pens.	46	—	—	—	—	..
45	Megacolon	Sto. 1st cl.	3	22	+	—	—	—	W
46	Osteomyelitis	Sto. 1st. cl.	3	21	—	—	—	—	..
47	Abd. pain	Sto. P.O.	Pens.	48	—	+	—	+	‡
48	Cartilage inj.	O/Sig.	H.O.	20	—	—	—	—	W
49	Hernia	A.B. R.N.V.R.	—	20	—	—	—	—	W
50	Cystitis	Sto.	H.O.	29	—	—	—	—	W

* Risk if exposed again. ** Breakdown could have been predicted on recall. † Needs watching. ‡ Doubtful risk on recall.

neurosis, 44 of psychosis, 8 psychopaths and 5 organic reactions. Judged by standards of civilian psychiatric practice they were easily modified, and responded to treatment with gratifying speed. Professor Henderson recently recalled that many of the psychiatric disorders of war seem to occur at a relatively superficial level. The same point emerges in this group which consisted largely of anxiety and depressive cases, without one classical case of conversion hysteria.

Anxiety states (A) accounted for 20 cases in the series. Symptoms were only moderately severe and none of the patients showed profound panic, vasomotor disturbance or enlargement of the thyroid. Possibly thyroid hypertrophy only occurs after more prolonged stress than these men had experienced. Anxiety with hysteria (AH) was present in 7 cases; the physical components of anxiety were less pronounced in this group. These two groups (A and AH) in which anxiety symptoms predominated included 27 patients in all and tended to occur among men in the younger age-groups who had experienced enemy action and who became fit to return to duty (table III).

Hysteria without anxiety (H) occurred in 13 patients, of whom 3 returned to duty. None of the 13 showed gross conversion symptoms such as paralysis or mutism. This was not due to chance; symptoms of the kind are rare among naval ratings. Beaton, discussing the same experience in the last war, suggests that, unlike soldiers, naval ratings tend to be individualists and skilled technicians, working under a different sort of discipline from the Army, and less open to mass suggestion. Moreover they are literally in the same boat and the development of hysterical paraplegia, for example, which might have a value for a man about to go over the top, would offer little advantage to one faced with immersion. Mobile warfare and the development of mechanised units such as tanks may diminish the incidence of conversion paralyses and alter the form of military psychiatric disorders. Again many men develop a bemused, apathetic state after prolonged bombardment, and the suggestible condition which ensues probably favours the development of hysterical motor symptoms. Naval ratings at sea are seldom exposed to continuous bombardment day after day, though the development of air bombing may change that.

There were 11 cases of reactive depression (RD); most of the patients were of a good type and made an excellent social recovery, but as it seemed likely that they would relapse if sent back to sea a high proportion had to be invalided. Endogenous depressions (ED), of which there were 31 cases, tended to occur among older men with a peak in the 35–45 age group (table III). Many of them were reservists of a good type, but 24 of them had to be invalided partly because the illness usually exceeded 3 months and partly because their symptoms, though of constitutional origin, had generally been precipitated by psychological stress, often domestic and financial. Not many of them had experienced enemy action but the prospect of it seemed less disturbing to them than difficulties at home.

There was only one obsessional case. Many naval ratings are extremely conscientious, and some might call them obsessional types (Taylor, 1940), so that it is noteworthy that only one obsessional neurosis developed and that cases of the kind are rarer throughout the Navy than in civilian practice. This finding gives no support to the theory that psychiatric reactions are simply morbid intensification or release of pre-existing personality features. Only 8 cases of psychopathic personality (PP) were found; none were reservists, and the most marked instances were found among those who had been enlisted for the period of hostilities only (HO). A single case of mania (MS) developed shortly after the man was bombarded; mild hypomanic symptoms as shown by elation and push of talk are common after an exciting experience, and it is remarkable that more people do not react to the stress of war by developing manic states. The remaining types of reaction do not call for special comment.

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Alcoholism was rare and sexual conflicts or the results of sexual deprivation appeared to play an insignificant rôle. No case showed effort syndrome, which is also very uncommon among naval ratings; the relative absence of opportunity or demand for marching may explain this. Is it equally rare among members of the Tank Corps?

Mental backwardness was present in 12 cases, and in 2 amounted to mental defect approaching the certifiable level; none of these patients had risen above standard V at school. None of the controls approached the certifiable level of mental defect, and all had reached the top standard at school except 3 (2 had gained standard VI and 1 standard V); of these, 2 appeared to be stable if dull. It seems probable that some of our patients broke down as a result of being placed at tasks beyond their intellectual capacity, while others were so defective as to be incapable of any form of naval service.

CASE 81.—A recruit of 25 from Northern Ireland who had been unemployed since leaving school except for short periods on newspaper rounds in his own village. His mental age was 9, and his personality grossly hysterical and immature; his instructors found him incapable of doing his work and as a result he became tearful and depressed.

Though none of the psychiatric cases was admitted as the direct result of head injury, a history of previous severe concussion was present in 11 of them—5 regulars, 2 reservists and 4 recruits (HO). Only 1 of the controls had a similar history. This finding confirms the experience of Hurst (1940) and Henderson (1939) that previous concussion predisposes to breakdown. No special type of psychiatric reaction was observed among them. While examining the controls (good exercise for the psychiatrist, who is otherwise apt to develop a sombre view of humanity) we noticed that they had a far greater output of physical energy than the psychiatric cases; they not only took an interest in games but played them, while the psychiatric cases if interested at all looked on.

PREDICTION OF BREAKDOWN

We attempted to assess how many breakdowns might have been predicted as the result of more thorough physical or psychiatric examination either on recruiting or recall, or from their Service record. Considering each case as a whole we regarded 39 in the series of 100 as predictable. The factors given below were worked out later.

ÆTIOLOGICAL FACTORS

We summarised material from the case-records under four headings.

Family history (FH).—This was considered to be positive (+) when: a near blood-relation (parent, aunt, sibling) had been in a mental hospital or attempted suicide; when more than one such relative had shown evidence of psychiatric disorder though not resulting in mental hospital treatment (shell-shock, obvious psychopathy as shown by chronic alcoholism or a very bad work record).

Past history (PH).—Considered to be positive when there was clear objective evidence such as: unsatisfactory work record; previous mental breakdown; repeated conflict with authority; a poor service record.

Personality (P).—Characteristics which gave grounds for concern without causing gross inefficiency such as hysterical, paranoid or schizoid psychopathy, long-standing anxiety of pathological intensity, mental backwardness (standard V or lower at school), immature emotional development, and anti-social traits.

Physical factors (PHY).—Such conditions as high blood-pressure, arteriosclerosis, neurosyphilis, defective vision and influenza; these were only assessed as positive when they appeared to be causal, not merely coincidental.

TABLE III—INCIDENCE OF THE VARIOUS DISORDERS IN RELATION TO EXPERIENCE OF ENEMY ACTION AND DISPOSAL

Disorder	Age-group				Total incidence	Duty	Inval.	In action	Not in action
	Under 25	25–35	35–45	Over 45					
ED ..	4	8	16	3	31	7	24	5	26
RD ..	4	3	3	1	11	2	9	3	8
Mix ..	0	0	1	0	1	0	1	0	1
MS ..	0	1	0	0	1	0	1	1	0
PP ..	3	3	2	0	8	3	5	0	8
A ..	5	6	8	1	20	11	9	8	12
AH ..	5	0	2	0	7	4	3	5	2
H ..	5	3	5	0	13	3	10	3	10
Ob ..	1	0	0	0	1	1	0	0	1
E ..	1	0	0	0	1	0	1	0	1
Hyp ..	0	0	1	0	1	1	0	0	1
OS ..	0	0	2	3	5	1	4	1	4
Total ..	28	24	40	8	100	33	67	26	74
Duty ..	12	8	9	4	33	—	—	10	23
Inval.	16	16	31	4	67	—	—	16	51

TABLE IV—PREDICTABILITY IN RELATION TO DIAGNOSES AND POSITIVE PSYCHIATRIC AND PHYSICAL FACTORS

Disorder	Predictable cases					Unpredictable cases				
	No. of patients	Family hist.	Past hist.	Personality	Physical exam.	No. of patients	Family hist.	Past hist.	Personality	Physical exam.
ED ..	9	6	6	4	2	2	10	5	5	2
RD ..	6	3	1	3	1	5	2	1	1	1
Mix ..	0	0	0	0	0	1	0	0	0	0
MS ..	0	0	0	0	0	1	0	0	0	0
PP ..	6	3	5	6	0	2	1	0	1	0
A ..	7	4	5	5	2	13	6	0	2	0
AH ..	1	1	1	1	0	6	3	0	2	0
H ..	5	1	5	4	1	8	4	2	4	3
Ob ..	0	0	0	0	0	1	0	0	1	0
E ..	1	1	1	0	0	0	0	0	0	0
Hyp ..	0	0	0	0	0	1	0	0	1	0
OS ..	4	0	0	0	4	1	0	0	0	1
Total	39	19	24	23	10	61	26	8	17	7
—		76					58			

Total positive factors in the 100 psychiatric cases = 134 (family hist. 45; past hist. 32; personality 40; physical exam. 17).
Total positive factors in the 50 surgical control cases = 32 (family hist. 6; past hist. 4; personality 6; physical exam. 6).

Positive marks were awarded conservatively in the series of psychiatric cases, but we erred on the side of generosity when awarding them to the surgical controls. During the war of 1914–18, teetotalism, irritability of temper and tuberculosis were regarded as significant factors in ætiology, but we have excluded them as too indefinite.

In the series of psychiatric cases it will be seen that the 39 predictable cases had 76 positive factors between them, whereas the 61 unpredictable had only 58. The proportion of positive past histories was high among the predictable cases, and of positive family histories among the unpredictable cases. This suggests that in attempting to judge each case as a whole we under-valued the prognostic importance of a positive family history. Among the controls only 2 cases appear to have been a bad risk from the start—an alcoholic reservist with domestic troubles and a recruit with a past history of fits. Of the remainder, 3 had undergone much alarming experience and were considered to be bad risks for the future, and 6 more appeared to be of nervous disposition, and might have been doubtful risks if exposed to severe stress. None of them was highly abnormal.

PROPHYLAXIS

The development of a neurosis in war-time should not necessarily absolve the patient from all forms of national service, and the psychiatrist should help to decide what form this service can usefully take. The problem has been, in the past, to decide whether to send men back to duty who may prove unsatisfactory and crack again, or to invalid them and thus make escape too easy. To send back an unsatisfactory man rouses the resentment of his superior officers, and to invalid all doubtful cases may increase the incidence of neurosis and make treatment in all cases more difficult. What inducement is there for X to recover and return to duty if Y is allowed to go safely home? In the last war Y not only got out of it but got a pension as well. The same difficulties apply to the choice of recruits. Air bombing and compulsory national service have potentially resolved some of these problems. Everybody is now in the firing line and the

fear of an easy psychiatric passport to safety has lost some of its force.

Mira (1939), as the result of his experiences in Spain, regards it as a function of the psychiatrist to prevent the unsuitable placing of recruits in the Services. Mayer-Gross (1939), from his experience in Germany, advises against putting too much emphasis on the potential neurotic; he found that many young men who seemed potentially unstable far from breaking down were stabilised by war service. No doubt many are benefited by training and service discipline. To say that prognosis should be conservative and cautious is not to suggest that no attempt must be made to weed out obvious misfits. We believe it should be possible to economise man-power and reduce the incidence of psychiatric disorders by a more stringent examination of recruits.

We suggest that each new recruit should be asked to sign a form stating: whether he has ever suffered from fits; whether he, or any member of his family, has ever been treated in a mental hospital, or for nervous trouble; what standard he reached at school; and the longest time he has held a job. He should be told that to give an incorrect answer constitutes an offence. Unsatisfactory answers would not necessarily lead to rejection but would prompt further inquiry. Our findings indicate the importance of a positive family history (even if only in the form of minor neuroses affecting several near relatives) in assessing a borderline case, especially if there are other suspicious features in the personality or past history. Our findings also support the recommendation of Henderson that a previous severe head injury is an indication for rejection. Men with severe grades of mental defect could be excluded by group intelligence tests. Tests for particular aptitudes could no doubt be readily devised which would make it easier to place men in jobs which suited them.

A patient who would have profited from such tests was a stoker reservist (CASE 55) from the Fishing Fleet who, either because he has been out of the service too long or is naturally slow witted, cannot adapt himself to the demands of oil-burning ships.

We believe that psychiatrists could, on occasion, help to decide whether an unsatisfactory recruit in the training establishment would respond to discipline or whether he should be transferred to some other form of national service. This might be achieved by periodical visits from the psychiatrist.

A patient of 16 (CASE 82) had been enuretic all his life but was a willing and promising recruit; the ridicule of his messmates during training led to two attempts to run away and eventually to a suicidal attempt. After a period in hospital his enuresis was greatly improved and his attitude towards it had been satisfactorily adjusted. His conflicts with discipline and personal misery might have been avoided by timely psychiatric advice.

DISPOSAL

In our series, 33% returned to duty and 67% were discharged from the Service as unfit for full duty; the reasons for the high rate of invaliding have been explained above. Most of those invalided made an excellent social recovery, and a few were able to take up jobs of national importance without much delay. But for the most part they had to go in search of work, unaided by any official recommendation, and were often discouraged by excessive competition. With very few exceptions they were men who could have been drafted straight from hospital into useful national work. Others could have been used after a further period of treatment at a psychiatric clinic.

We have considered carefully under what conditions each of our cases might have made a contribution to the national effort without risk of a relapse, and have set out our suggestions in table v. Any scheme for disposal of cases should not, of course, be applied to the Navy alone, but to civilians and members of the other fighting services. The following considerations arise out of the table.

(*a*) A slight fall in the number of men sent back to full duty would mean that certain "doubtful risks" could be removed from conditions of severe stress and placed in jobs where they would be less likely to break down.

(*b*) It is now possible to send patients to permanent shore duty who are likely to break down at sea. This should economise skilled workers and provide occupation for some of the doubtful risks mentioned above.

(*c*) Breakdowns may be precipitated by prolonged service in some branch for which the patient is unsuited (e.g. mine-sweeping). Psychiatrists could recommend appropriate transfers. For example cases influenced by genuine and severe sea-sickness could be transferred to a larger ship.

(*d*), (*e*), (*g*), (*j*) and (*k*). Psychiatric clinics are needed for more prolonged treatment of those who will eventually be fit for some kind of national service. Many such patients would

TABLE V—ACTUAL DISPOSALS COMPARED WITH DISPOSALS SUGGESTED FOR THE BEST USE OF MAN-POWER

Disorder	Actual disposals		Suggested disposals											
	Duty	Inval *	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*
ED	7	24	2	8	2	2	5	2	1	2	1	2	1	3
RD	2	9	0	0	2	0	0	4	0	3	1	0	1	0
Mix	0	1	0	0	0	1	0	0	0	0	0	0	0	0
MS	0	1	0	0	0	0	0	0	0	0	0	0	1	0
PP	3	5	1	1	1	0	0	1	0	3	1	0	0	0
A ..	11	9	4	5	4	0	0	3	0	3	0	0	0	1
AH ..	4	3	0	2	2	0	0	0	0	2	1	0	0	0
H ..	3	10	3	2	0	0	1	1	0	4	2	0	0	0
Ob ..	1	0	1	0	0	0	0	0	0	0	0	0	0	0
E ..	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Hyp	1	0	0	0	1	0	0	0	0	0	0	0	0	0
OS ..	1	4	0	1	0	0	0	0	0	0	0	0	0	4
Total	33	67	11	19	12	3	6	11	1	17	7	2	3	8

* Five of these cases were sent to mental hospitals.

a. Return at once to full duty.
b. Return at once to shore duty (relief parties).
c. Return to full duty, but need placing in accordance with psych. advice.
d. Need longer treatment in a psych. clinic before returning to full duty.
e. Suitable for shore duty after further treatment in psych. clinic.
f. Suitable to return to civilian jobs. of nat. importance.
g. Suitable to return to civilian jobs after further treatment in a psych. clinic.
h. Suitable for other forms of nat. service under discipline.
i. Suitable for other forms of nat. service under discipline and some psych. supervision.
j. Suitable for disposal *i* after further treatment in psych. clinic.
k. Need treatment in psych. clinic before disposal is decided.
l. Invalided.

be unsuitable for mental hospital treatment, would not be certifiable, and if induced to go as voluntary patients would refuse to stay. At present, any patient who has been invalided from the Navy is ineligible for admission to special E.M.S. hospitals, such as those at Sutton and Mill Hill.

(*f*) When a discharged patient signs on at a labour exchange it would help him if a report recommending suitable work was available.

(*h*) Some patients, particularly psychopaths and hysterics would benefit from a labour corps or rehabilitation camp, where all kinds of manual labour could be done under modified Naval discipline, at not more than naval rates of pay, and with few if any concessions on psychiatric grounds as regards work.

(*i*) Camps where work was graded and performed under conditions of discipline tempered by psychiatric advice would also be valuable. Here the more unstable psychopaths, cases of chronic anxiety, higher grade mental defectives and patients who needed a special environment to prevent relapse could play a useful part.

Only 8 patients in our series appeared incapable of any form of national service, as compared with 67 who were actually discharged or sent to mental hospital. Not all of these were social dead-losses, but the services of a large proportion of them were lost until they were caught up into some kind of work. Our suggestions aim at abolishing this wasteful delay between recovery and social effectiveness. The proposals concerning shore service and the use of psychiatric advice in placing men within the Service are now in operation in the Navy; but similar problems, perhaps in a different order of importance, must occur elsewhere. The suggested link with the labour exchanges and the two forms of rehabilitation camp should not be beyond the wit of man to establish with the coöperation of organisers of industry.

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SUMMARY

An investigation was made into the incidence of different forms of psychiatric disorder in 100 admissions to the neuropsychiatric unit of a naval auxiliary hospital.

The proportion of breakdowns which might have been predicted by previous psychiatric examination has been estimated at 39%.

The family history, past history, personality and physical findings in these cases have been compared with those of 50 surgical patients in an attempt to discover which factors should be regarded as the most useful indications of instability. It appears that the proportion of positive past histories was high among the predictable cases and of positive family histories among the unpredictable cases.

Valuable man-power might be economised by getting a fuller history from recruits, arranging for psychiatrists to interview unsatisfactory recruits in training establishments, excluding mentally defective men by the use of group tests, and instituting tests of personal aptitude. Some patients who have broken down give good service on shore duty if not fit for full duty. Others might be drafted to rehabilitation camps, or given further treatment at psychiatric clinics which should be made available for invalided naval ratings. A report should be sent to the labour exchange with patients invalided out of the Service, so that they may be found appropriate work.

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AN OPERATION FOR EPIPHORA

BY H. B. STALLARD, M.D. Camb., F.R.C.S.

MAJOR, R.A.M.C.; ASSISTANT OPHTHALMIC SURGEON TO ST. BARTHOLOMEW'S HOSPITAL, LONDON

EPIPHORA is a constant annoyance and the thought that it is going to persist throughout life is even more irritating to the young than to the elderly, who may become more resigned to it. Fibrous obstruction in the canaliculi is not easy to correct by plastic procedures which, indeed, are only practical in the case of the lower canaliculus in its course beneath the conjunctiva from the punctum to within 1 or 2 mm. of the conjunctival-skin junction of the inner canthus. Beyond this limit, and in the case of the upper canaliculus, attempts to reconstruct the passage fail to effect relief. Nor is careful conjunctivoplasty to re-form the lower canaliculus always successful; the surgical work is very fine and the prospect of eventual fibrous contracture at the suture junctions considerable. There is no reasonable hope of reconstructing the canaliculi where they pass deeply backwards and inwards through the connective tissue between the inner canthus and the lacrimal sac.

Traumatic severance of the canaliculi at this site, and their ultimate occlusion by fibrosis, prompted me to devise the following operation and perform it on a young Irish Guardsman who, while boxing in the welter-weight championship of Ireland in 1938, had sustained a ragged crescentic wound 2 mm. medial to his right inner canthus. The wound had divided both canaliculi and the subsequent fibrosis had occluded them and rendered them impermeable to a probe. The epiphora impaired his efficiency as a soldier and was an especially annoying handicap in shooting.

OPERATION

Under local anæsthesia the lacrimal sac was exposed through the classical incision for dacryocystectomy. The fundus of the sac was freed by dissection from adjacent tissues and together with the medial wall of the sac was separated from the lacrimal fossa throughout its length. The lateral wall of the sac was dissected free from fibrous tissue—the result of the traumatic lesion—for about half its length. A suture of number 1 black silk was passed through the summit of the fundus and the sac thus mobilised was drawn laterally and slightly forward to ascertain whether it would come into the inner canthus without tension. An oblique stab incision 5 mm. long was then made with a double-edged knife in the lacus lacrimalis (fig. 1), and carried through the connective tissue at this site downwards, medialwards and slightly backwards aiming at the centre of the lacrimal fossa. The knife was withdrawn and a pair of plane iris forceps passed through between the lips of the incision; these emerged in the lacrimal fossa and were used to seize the stitch in the fundus of the sac and draw it into the lacus lacrimalis. The sac was then gently retracted laterally and forwards so as to expose the orbital fascia behind it. This was incised vertically so as to allow orbital fat to herniate into the lacrimal fossa and form a soft pad occupying the space between the new oblique position of the sac and the bony wall of the lacrimal fossa (fig. 2). The sac was drawn upwards and outwards through the incision until 3 mm. of the fundus was projecting into the inner canthus. It is essential that the sac should not be under tension or kinked, but should lie in a plane inclined downwards, medialwards and backwards. A fine plastic hook was inserted into the lower punctum and traction was made downwards to evert the lower lid margin near its termination at the inner canthus, thus exposing the sac and the edges of the conjunctival incision. Four sutures of 000 black silk on half-circle arterial needles were inserted through the wall of the lacrimal sac and the conjunctiva midway along the posterior and anterior lips of the conjunctival incision and at its medial and lateral extremities (fig. 2). This done, the summit of the fundus was cut off and the patency of the sac and naso-lacrimal duct was tested by gently passing a probe. The incision for exposure of the sac was then closed by a subcuticular stitch of silk and a light dressing was applied.

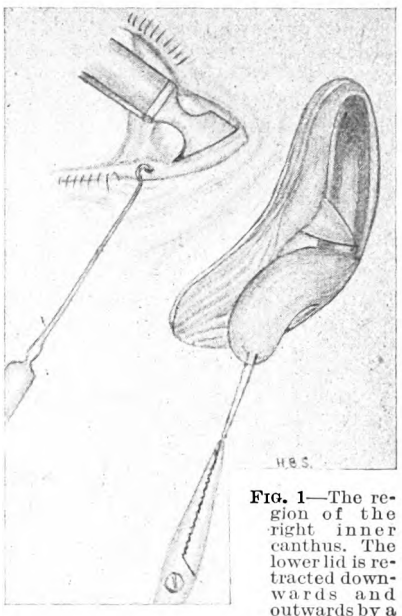

FIG. 1—The region of the right inner canthus. The lower lid is retracted downwards and outwards by a sharp hook in the lower punctum; the mobilised lacrimal sac is deflected forwards and downwards away from the lacrimal fossa; and the incision through the lacus lacrimalis into the lacrimal fossa is being made with a broad double-edged knife.

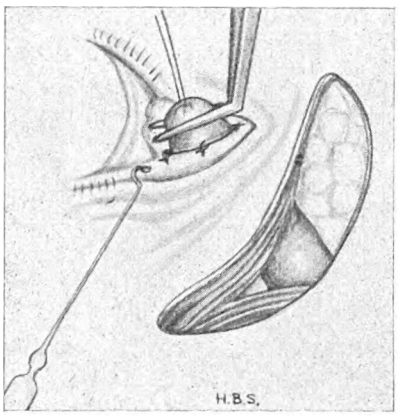

FIG. 2—The lacrimal sac is secured to the edges of the conjunctival incision by sutures and the fundus of the sac is being excised. The orbital fascia has been incised vertically and through this the orbital fat has herniated and is seen occupying the lacrimal fossa.

As a result of this operation epiphora has been completely relieved and the ostium admits the bulbous extremity of number 8 Bowman's probe—4·5 mm. in diameter. The conjunctival epithelium runs neatly into that lining the sac. In devising the operation it occurred to me that the caruncle might afford some obstruction by overhanging the entrance to the ostium, but this has not been the case. I had contemplated

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partial resection of the lower half of this structure, but it does not seem to be necessary.

As far as I know this operation has not been done before and is original in its conception. I suggest tentatively the name conjunctivo-dacryocystostomy.

I have to thank Colonel Wallace Benson for permission to publish this case.

SHELTER DEATHS FROM PULMONARY EMBOLISM

By Keith Simpson, M.D. Lond.
ASSISTANT LECTURER IN FORENSIC MEDICINE TO GUY'S HOSPITAL

Soon after serious night air-attacks on London began, in September, 1940, it became clear that the incidence of the various diseases commonly responsible for sudden death had changed. There was an appreciable rise in deaths from senility, acute suppurative bronchopneumonia and pulmonary embolism. My own figures for autopsies done on cases of sudden death reported to the coroner in various London districts in September and October, 1940, excluding cases of crime, accident, maternal and newborn deaths, are shown in the table.

CAUSES OF DEATH FOUND AT AUTOPSY IN SEPTEMBER AND OCTOBER, 1940 AND 1939

	1940	1939
Senility	16 (9)	6
Cardiovascular—		
Coronary disease	55 (12)	67
Fatty and toxic myocardial degeneration	9 (5)	8
Hypertension	12 (4)	8
Valvular disease	9 (1)	10
Ruptured aorta	6 (2)	3
Cerebral hæmorrhage	16 (4)	18
Cerebral thrombosis	1 (0)	2
Pulmonary embolism	24 (21)	4
Respiratory—		
Bronchitis and emphysema	13 (3)	16
Bronchopneumonia	18 (11)	8
Influenzal pneumonia	2 (1)	1
Lobar pneumonia	5 (0)	6
Tuberculosis	8 (2)	5
Nervous—		
Encephalitis	..	1
Epilepsy	4 (1)	1
Meningitis	1 (1)	..
Tumour	..	4
Alimentary—		
Appendicitis	1 (0)	3
Obstruction	3 (1)	2
Peptic ulcer	5 (0)	4
Malignant growths	11 (0)	9
Other causes	14 (0)	15
Poisoning	22 (2)	41
Total	255 (80)	242

The figures in parentheses show the numbers dying in, or soon after leaving, air-raid shelters.

The figures for the same period of 1939 show that there has been a significant rise in the number of deaths from senility, bronchopneumonia and pulmonary embolism and a fall in the deaths from poisoning. Most cases of poisoning are suicidal, so that this index of disturbing times shows an improvement from the peak period round the date of declaration of war. It may reasonably be supposed that the increase in sudden deaths from senility and acute bronchopneumonia is due to the greater exposure of older people both in their battered homes and their journeys to and from air-raid shelters.

It is not to these groups that I wish to draw attention, but to the more striking—indeed six-fold—increase in the occurrence of fatal pulmonary embolism. The increase from 4 to 24 cases is accounted for by the 21 cases of sudden death from this cause in persons in, or more usually, leaving the shelters after a night or a succession of nights in them. It was clear that it resulted in some way from this enforced confinement, and a succession of cases in which the details of history recurred with striking constancy at once disclosed the cause. The following is a typical example.

CASE-RECORD

A woman of 60 years took a deck chair into a public air-raid shelter and sat in it continuously for 10 hours. When she got up she complained that her legs were numb and cramped, and she found that her ankles were swollen. Some 8–10 mins. after leaving the shelter to walk home she collapsed in the street, dead. At autopsy it was noted that she was of stout build, and had mild varicosities of the veins of both legs. There was no pelvic obstruction but excess of mesenteric and retroperitoneal fat and mild fatty degeneration of the myocardium likely together to promote venous stasis. Small tags of very fresh antemortem clot still lay in some parts of the tibial veins, but most of it had become separated and was found, as a series of short clots of small calibre, lodged well down in the first subdivisions of the pulmonary arteries. The calibre of the clot was much smaller than that found, for instance, in postoperative embolism, and it was also much fresher, being some hours old only, as yet hardly adherent to the small veins in which it had been formed, and consisting mainly of propagated (rather than laminated) clot.

DISCUSSION

It was clear that the process was mainly mechanical. The subjects were elderly (18 of the 24 were over sixty), usually a little obese, and often showed varicosities of the leg veins. They were therefore more liable to the condition than healthy young adults or children; but the precipitating circumstance was without doubt a long period of rest in a deck chair or some similar seat, the front edge of which pressed into the legs as they lay over it, compressing the veins and causing obstruction, statis, œdema and thrombosis—probably in that order. At the time that this explanation was being given to doctors attending autopsis, a number of them remarked on the increase in cases of œdema of the feet and postural sciatica attending the surgeries and outpatient departments of hospitals in the London area. These conditions clearly had the same ætiology.

Care was necessary at autopsy to ensure that the clot in the lung was not missed. It lay well down in the subdivision of each pulmonary artery and consisted of small calibre thrombus; being principally crimson "propagated clot," it was less obviously antemortem than the older laminated clot familiar, for instance, in postoperative cases.

The danger to life of pulmonary embolism clearly exceeds the danger (as distinct from inconvenience) of common colds, sore throat, bronchitis, minor epidemic infections and contagious skin diseases to which the Horder Committee have directed their main attentions. There has been no similar rise in the incidence of grave epidemic maladies as far as the death-rate can show. The figures for the two months given in the table confirm this; there was one death from meningococcal meningitis, one from influenzal pneumonia and none from lobar pneumonia. The moral is clear: people—especially elderly people—who are forced to spend long periods in air-raid shelters must be given provision for lying down.

It is noteworthy that cases of fatal pulmonary embolism are already decreasing again, concurrently with the provision of bunks for sleeping. These figures are published in order to emphasise the urgency of the need for bunks; the 21 deaths quoted here are attributable to the lack of them. If the condition, as may be hoped, proves to be a transient danger, the figures will call attention to the rather neglected mechanical factor in the development of thrombophlebitis; and they also show that it occurs more commonly in the tibial veins than in the large pelvic veins to which it later becomes propagated.

SUMMARY

In autopsies done on cases of sudden death reported to the coroner in various London districts the number of cases of pulmonary embolism rose from 4 in September and October, 1939, to 24 in the same two months of 1940. In 21 of this year's cases death took place while the patient was in an air-raid shelter or had just left one and the embolism is attributed to an elderly and obese person sitting for long periods in a chair, whose edge compresses the veins in the legs. This danger emphasises the urgent need for bunks in shelters.

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SANTONIN POISONING

A FATAL CASE

By H. A. COOKSON, M.B. Edin., F.R.C.P. & S.E., D.P.H.
PATHOLOGIST TO SUNDERLAND ROYAL INFIRMARY; AND
C. J. H. STOCK, B.Sc. Durh., F.I.C.
PUBLIC ANALYST FOR THE COUNTY OF DURHAM

AN unemployed welder, aged 21, joined the Army in June, 1939, and was discharged in December with gastric trouble. His doctor had seen him off and on from July, 1939, until just before his death on Aug. 5, 1940, and had given him bismuth and stomach mixtures but no santonin. He had complained of pains in the stomach, both after food and at other times, and had given a history of occasional vomiting and constipation. His relatives said that he had been bilious for years and fanciful about his food, eating all kinds of queer things, and that he had gradually become very thin. On July 30, 1940, he was violently sick and continued to vomit, off and on, until Aug. 4 when his doctor was called in and found him in a state of collapse. He was admitted to hospital at once, being then in a confused semiconscious state, unable to give an account of his illness. He was emaciated, dehydrated and critically ill, and he appeared to have some difficulty in swallowing. Milk and glucose were given but he died at 12.50 A.M. on the 5th. The case was reported to the coroner.

Autopsy findings.—The body showed great emaciation. The skin was tough and harsh, and of a dull brownish shade, especially over the abdomen. The lungs were healthy. The right side of the heart was slightly dilated but otherwise it was normal. The teeth were slightly carious; tongue furred and brownish in colour; the lips were normal. The œsophagus was whitened and blistered throughout its length and some of the mucous membrane hung in shreds. The stomach was greatly dilated and contained a small amount of milky fluid; the mucous membrane was atrophic and coated with yellow mucus, the cardiac end being blistered like the œsophagus. The duodenum was congested in its first and second parts. The small and large intestines were empty and apparently normal except that the walls were very thin. All other organs were normal.

On analysis a crystalline residue weighing nearly gr. 7¾ was obtained from the stomach. It is noteworthy that this quantity was present even after repeated vomiting. The material gave the chemical reactions of santonin. There was no unchanged santonin in the urine, but traces were present in combination.

DISCUSSION

The elimination of santonin from the body takes place slowly, and it acts as a cumulative poison. Poisoning may therefore occur not only as a result of wrong dosage but also if santonin has been administered for too long a period. The question of idiosyncrasy has also to be considered. This man suffered from some neurosis associated with dyspepsia, and may have taken santonin without advice from his doctor, believing he had worms. We were not able to obtain any history of yellow vision.

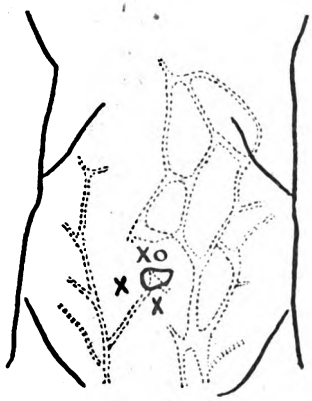
Our thanks are due to Dr. Fenwick Leishman of Crook, co. Durham, whose patient this man had been, and to Dr. Arthur Todd of Durham County Hospital for permission to use the clinical notes of this case.

CONTINUOUS VENOUS HUM AND THRILL IN CIRRHOSIS OF THE LIVER

BY LESLIE A. WILSON

IN recent years, interest has been shown in the continuous venous hum heard in the epigastric region in some patients with cirrhosis of the liver (Bates 1937, Kenway 1937, Mirvish 1937). Post-mortem dissections have suggested that these murmurs are due to local constrictions, varicosities or irregularities of calibre of the anastomotic veins (Lutembacher 1936, Hall 1937). In the case here reported such a murmur was heard below the umbilicus, and was associated with a palpable thrill, a feature which so far as I am aware has not hitherto been described.

A boy of 15 was admitted to the Aberdeen Royal Infirmary on Aug. 7, 1940. Three years before cirrhosis of the liver had been diagnosed on the findings of jaundice, considerable hepatic enlargement and enlargement of the spleen. Jaundice of varying intensity had been present ever since. The liver was found to be no longer palpable, the spleen was felt down to 10 cm. below the costal margin, and there were signs of a little free fluid in the abdomen. With the patient standing several distended anastomotic veins were seen in the abdominal wall, chiefly above the umbilicus (see figure). The thrill was continuous, and was felt superficially in a well-defined area 5 cm. by 4 cm. directly below the umbilicus. It was obliterated by light pressure in this area and also at points immediately below and above and 3 cm. to the right. It was not felt with the patient in the erect posture. The murmur was continuous and roaring. It was heard with maximum intensity in the area of the thrill, and also diffusely over the whole anterior abdomen. It disappeared when deep pressure was applied at the points mentioned above. It was unaffected by quiet respiration, but on full inspiration it became louder and rougher in character. It was slightly diminished when the patient was standing.



The venous anastomoses in the patient's abdominal wall, as traced from an infrared photograph.
o = umbilicus. The area outlined immediately below this is the site of the thrill.
x = points where pressure with the examiner's finger caused the thrill to disappear.

I have to thank Prof. R. S. Aitken for help in the preparation of this note.

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NEW USE FOR THE BOTH RESPIRATOR

BY R. R. MACINTOSH, D.M. Oxfd, F.R.C.S.E., D.A.
NUFFIELD PROFESSOR OF ANÆSTHETICS, UNIVERSITY OF OXFORD

IT is commonly held that the high incidence of pulmonary complications after upper abdominal sections, particularly in the elderly, is in large part due to the restricted respiratory movements which follow such operations. If morphine is not given freely respiratory excursions are diminished owing to the pain in the abdominal wound which they cause; if morphine is given the respiratory centre becomes depressed and the respiratory excursions are correspondingly limited. Many otherwise uneventful abdominal operations in the elderly terminate fatally within a few days from hypostatic pneumonia, which starts possibly from inadequate expansion of the lungs for the reasons indicated. It therefore seems rational to assist the respiratory movements artificially during the immediate postoperative period, performing for the patient what he is unwilling to do for himself. This has been carried into practice by the use of the Both respirator ("iron lung") in two cases for 48 and 24 hours respectively after gastrectomy.

In the first case, operated on by Mr. Elliot Smith, the man was reasonably fit and recovery without the use of the respirator would probably have been equally uneventful.

In the second case, that of a man aged 53, the patient was gravely ill. On Sept. 26, while in the medical ward under treatment for a chronic gastric ulcer, he became unconscious, was incontinent, and brought up 2 oz. of dark vomit. The case-notes continue: "Sept. 27. By 10.30 A.M. he had had five further hæmorrhages, each of greater volume than the previous one. In view of the fact that these hæmorrhages

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had started in spite of the strict diet which he had been having it was decided that the best chance of recovery lay in employing surgical means." At 4.30 P.M. on the same day Mr. D. C. Corry operated under a combination of local and light general anæsthesia and performed gastrectomy, removing, to quote the X-ray report, the "huge crater present on the lesser curvature and posterior wall." During the operation the transfusion needle became blocked but immediately afterwards he was given 900 c.cm. of blood, after which he was placed in the respirator, and an intravenous drip continued with 5% glucose. The following notes are taken from the case-sheet. "Midnight. Drip running satisfactorily—little affected by alterations in pressure. Sept. 28, 9.45 A.M.: has had 5 pints of glucose (intravenously) since operation; tongue still dry. Evening: intravenous drip slowed to 15 drops per minute; tongue moist; passed 24 oz. of urine during day. Sept. 29: tongue moist; drip running very slowly—ninth bottle put in during night, tenth this morning. Sept. 30: improvement maintained; intravenous drip discontinued." The patient remained in the Both respirator (running at 20 respirations per minute) in a semiconscious condition for 24 hours without restlessness or discomfort. He said afterwards that he felt comfortable and at rest in the iron lung, and welcomed the mechanical assistance to his respiration. He did, however, experience some sense of confinement towards the end of the 24 hours. Progress continued until Oct. 9 when the case-sheet records: "Complains of almost continuous cough through the night." On the 14th he was transferred back to the medical ward and a note made that the breath sounds on the right side were diminished. The report of a radiographic examination on this date says: "Opacity present over the right chest may represent an encysted pocket of fluid." On the 17th the chest was needled but no fluid found. The patient's condition gradually deteriorated and he died on the 25th. At autopsy the only relevant finding was a large quantity of pus in the right pleural cavity.

Despite the fatal ending to this second case it is felt that it is worth recording owing to the remarkable recovery in the immediate postoperative period. The increased circulation in the pulmonary capillaries consequent on the continued full expansion of the lungs may have helped him to tolerate the large amount of intravenous fluid given without developing pulmonary œdema.

Medical Societies

ROYAL SOCIETY OF MEDICINE

SECTION OF OTOLOGY

AT a meeting of this section on Dec. 6, with Mr. LIONEL COLLEDGE in the chair, a discussion on

Causes of Failures in the Treatment of Acute Otitis Media

was opened by Mr. MUSGRAVE WOODMAN. He said that there were four chief causes of failure: infection in the mastoid air cells, infection in the postnasal space, disease in the attic region of the middle ear, and unsuspected tuberculosis. The treatment of the first two conditions is along the usual lines, but the third has been the subject of some conflict of ideas. It was manifest clinically as a perforation in Shrapnell's membrane. A mastoid operation was the proper treatment for these cases, and although it might seem a radical measure yet it was a very successful one. The discharge otherwise persisted, as conservative treatment alone was rarely sufficient to clear it up. The diagnosis of tuberculosis was not often made in this country in cases of otitis media, yet it was by no means an uncommon disease in other countries. Perhaps it has been overlooked here. At any rate there was a definite group of these cases which do not dry up as a rule with local applications. Again operation with the strictest asepsis was necessary. He had cured some by performing a cortical mastoid operation, removing all the diseased bone and then suturing the wound. Healing is obtained by first intention and the discharge ceases. But when secondary infection of the middle ear and its adnexa had occurred a radical mastoid operation became necessary. A dry and clean skin-lined cavity resulted.

Mr. T. B. LAYTON thought that the problem was largely bacteriological. The disease remained acute so long as the invading organisms were from the nasopharynx, but became chronic when there was secondary infection by organisms from the skin of the meatus. At about the 6th week in a case of suppurative otitis media this may have happened—by the 10th week it was almost certain. The 7th to the 9th week was therefore a crucial period. He had been taught, although he now no longer believed, that the infection proceeded by a series of jumps from the eustachian tube to the middle ear and from the middle ear to the mastoid cells. He was sure that the whole of this area was infected from the beginning of the disease, and that two stages could be defined—the acute invasive, and the period of reaction and repair. Most cases get well spontaneously and the remainder are largely a nutritional matter; Dr. Kerridge had shown how the incidence of chronic suppurative otitis media depended on malnutrition and bad environment. Among the causes of failure in the treatment of otitis media he would put early myringotomy. This was wrong pathologically, because it was like incising an area of cellulitis before the localisation of pus, and had been proved so clinically. The second cause was the use of "wet treatment." Antiseptics would only kill the germs together with the tissue in which they were lodged, and this destruction of skin allows secondary infection to penetrate into the middle ear. The third cause was dirt, especially lack of control of hair. He had often seen a wisp of hair pick up pus from the external meatus, causing a pustular eczematous process on the skin of the face and even conjunctivitis. In considering measures useful in getting these cases to heal he stressed free drainage from the eustachian tube. He did not believe that sinusitis was as common in children as it is the fashion to suppose, and that the nose is best drained by blowing it *à la paysanne*. The siphon douche is safe when carefully used in the second stage of the infection. The nose and nasopharynx are best drained by the assumption of the erect posture, and patients should be ambulant as soon as possible or otherwise encouraged to lie prone or semi-prone for long periods. When there is much discharge it should be mopped away with dry mops, otherwise no aural toilet was necessary. In encouraging eustachian drainage movements of the palate, chewing and mild physical exercises were helpful. Adenoidectomy in the early stages of the infection was not only useless but wrong, for the operation only exposed a raw area to the hæmolytic streptococci and in any case could not remove the submucous lymphoid tissue of the cartilaginous portion of the tube which was the real cause of the obstruction. Suction of the pus through the hole in the drum by means of the Siegle speculum was occasionally a valuable method of clearing up a case. Secondary paracentesis late in the second stage in cases where the drum showed a pyramidal protrusion and there was some sticky mucoid discharge was often curative. A little discharge in the meatus was sometimes present when no perforation in the drum could be seen. This was due to a small ulcer in the skin of the floor of the meatus next to the drum, and the treatment was the removal of the overlying scab and painting the base with glycerin and yellow oxide of mercury ointment. If the otorrhœa persisted for longer than 6 weeks a mastoid infection was possibly present. The decision to operate should be made after assessing the amount and nature of the discharge, whether or not it was pulsatile, the degree of deafness and the X-ray findings.

Mr. J. D. MCLAGGAN said that failure to cure this disease and to prevent it and recurrences was not confined to any one set of surgeons; failure was experienced by those who removed lymphoid tissue and those who preserved it, those who drained sinuses and those who did not. Chemotherapy may have reduced the incidence of mastoiditis but it had not prevented the onslaught of otitis media, and much damage may be done in the early stages. Myringotomy was an excellent operation if performed when there is pus in the middle ear; doubt as to its presence should not be used as a reason for urging the early performance of the operation. There are harmful possibilities, as the cut may not heal, the ossicles may be damaged, and the middle ear may never be the same afterwards. The operation should never be entered on lightheartedly—performed by an inexperienced person in a poor light in an uncleansed meatus with undefined landmarks. The incision into the posterior half of the

drum which is recommended in most books is not good, for this area of the middle ear is often not infected. This is shown by the fact that most spontaneous perforations are in the anterior half. He thought that too much local treatment is bad and liked alcohol used if the ear is to be mopped clean. Hydrogen peroxide was sometimes invaluable to break up blood-clot, but should always be subsequently removed. It is unnecessary to leave a gauze wick in the meatus and it merely becomes soiled and acts as a dam; while pus is present it will come out and there is no need for suction through the meatus.

Reviews of Books

Surgery of Modern Warfare

Part I. Edited by HAMILTON BAILEY, F.R.C.S., surgeon to the Royal Northern Hospital, London. Edinburgh: E. and S. Livingstone. Pp. 160. 12*s.* 6*d.*

IN some respects the first part of this important work is disappointing. It deals with the broad aspects of wound treatment and Mr. Hamilton Bailey, who is a surgical compère of experience, can never before have had to marshal so large and unwieldy a team of expert assistants. There are sixty-five contributors to the book, working in different parts of the British Isles and Mr. Hamilton Bailey has done well to reduce overlapping by a careful selection of chapter headings, and, it may be suspected, by rigid pruning; but he has been unable to avoid inconsistencies and in some places contradictory advice. For instance, in one chapter the practice of searching for a foreign body under the fluoroscopic screen is condemned; in a later one the method is fully described and recommended. The writer on chemotherapy doubts the value of the local application of the sulphonamides to wound surfaces; later writers advocate this practice. These inconsistencies are confusing, especially to the beginner; to the experienced student of surgery, who takes what he reads with a pinch of salt, they are of less moment. In places, too, it seems as though enthusiasts have been trusted too freely to assess the value of their own methods. Thus a radiotherapist strongly advocates the X-ray treatment of gas gangrene and recommends that it should be tried for at least three days—a policy which, most surgeons would agree, might lead to dangerous delay. On the other hand the surgical writer on gas gangrene is not impressed with the value of anti-gas-gangrene serum, despite recent work on its efficacy when used in conjunction with drugs of the sulphonamide group. The uncritical reader may therefore get the impression that in the treatment of gas gangrene X rays hold a more important place than anti-gas-gangrene serum, which would certainly not conform to current surgical opinion. There is, however, an excellent classification of war wounds, and the problems of shock and transfusion methods are ably discussed. More space might have been allotted to burns but the contributor has managed to pack much practical information into small space. It would have been valuable to lay down a definite time-limit after which primary suture of war wounds is absolutely contra-indicated. There is a classical account of tetanus which deserves special mention.

Modern Drugs in General Practice

By ETHEL BROWNING, M.D. Lpool. London: Edward Arnold and Co. Pp. 236. 10*s.* 6*d.*

THIS book contains chapters on the sulphonamides, gold salts, drugs acting on the cardiovascular and autonomic nervous systems, sedatives and hypnotics, diuretics and urinary antiseptics, gastro-intestinal remedies (including anthelmintics) and external applications (including local anæsthetics. The chapter on the sulphonamides, the various preparations of which are carefully and separately considered, rightly takes pride of place. The author points out that these drugs, which are bacteriostatic rather than bactericidal in action, require to be given early and in adequate dosage, preferably with sodium bicarbonate to combat acidosis. There can be no doubt that at present they are being prescribed somewhat indiscriminately and often in doses too small to be effective. Nevertheless, in the author's reasonable anxiety to stress their potential evil effects she has, perhaps, exaggerated their dangers. The fact that idiosyncrasy, or even agranulocytosis, occasionally follows the use of sulphanilanide and sulphapyridine should not deter the general practitioner from using them intelligently.

This is a valuable, well-indexed book of reference and the extensive bibliography shows at what pains the author has been to back her statements with authority.

Code of Rules for Prevention of Communicable Diseases in Schools

(10th ed.) Issued by the Medical Officers of Schools Association. London: J. and A. Churchill. Pp. 71. 3*s.*

TIME and energy have been freely expended on the control of infectious diseases in the schools of this country. The Medical Officers of Schools Association, being particularly concerned with the problem, can speak with some authority on it. In the tenth edition of their code of rules, which appears after an interval of twelve years, the revision committee have naturally found it necessary to make considerable modifications but they have done it without impairing the incisive and lucid character of previous editions. The preliminary sections cover a wide range of general hygienic measures, including clean transport and storage of milk as well as clean preparation. Adequate bed-head spacing in dormitories is advocated in place of spacing based on floor area or cubic capacity, which may be fallacious. The committee view school closure as a measure to be adopted only in very exceptional circumstances and agree that the general trend towards observing contacts in school rather than rigidly excluding them from school has much to commend it. The section on communicable diseases describes no less than twenty-five diseases or disease groups. Necessary amendments of some incubation and isolation periods have been introduced, and there is now a complete section on the control of respiratory infections, including the common cold and influenza. Scarlet fever is given its proper place as a particular manifestation of the much larger group of "streptococcal infections." There is an agreeably simple table comparing varieties of ringworm; treatment of these troublesome infections is briefly but adequately described in an appendix. Other appendices deal with the various immunological and other tests now commonly employed in diagnosis and treatment of infectious diseases. Although primarily intended for school authorities this informative booklet should interest anyone faced with the control of infectious diseases, particularly under conditions of close communal existence. Its appearance now is opportune.

Fractures and Dislocations

(2nd ed.) By EDWIN O. GECKELER, M.D., F.A.C.S. London: Baillière, Tindall and Cox. Pp. 307. 22*s.*

THERE seems to be no end to the demand for books on fractures and no lack of surgeons to write them. This little book deserves to survive, for it presents a large amount of useful information within a comfortable compass. The first section, on general principles, ranges from first-aid to occupational therapy and medico-legal affairs. In describing methods of treatment Dr. Geckeler wisely confines himself to procedures which in his opinion are satisfactory and there is a pleasing absence of long-winded digressions about alternative methods. The descriptions are clear and unambiguous, the illustrations on the whole well chosen, and altogether the book provides a useful introduction to the subject.

Mechanisms of Biological Oxidations

By DAVID E. GREEN, senior Beit fellow, institute of biochemistry, University of Cambridge. London: Cambridge University Press. Pp. 181. 12*s.* 6*d.*

THOSE who have not been intimately connected with work on biological oxidations during recent years may be a little staggered to realise that Mr. Green has been able to classify the enzymes (and incidentally his chapter headings) according to the chemical nature of the prosthetic group. Thus we have a chapter on each of the following: iron porphyrin protein enzymes; pyridinoprotein enzymes; flavoprotein enzymes; copper

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protein enzymes, with an addendum on a zinc protein enzyme; thiaminoprotein enzymes; cytochrome-reducing dehydrogenases; and unclassified oxidation enzymes. The last chapter, which is one of the shortest, deals with oxidations in organised systems, and includes an account of the succinic and citric acid cycles. Each chapter concludes with 50–100 references. The book is written by an expert, and is sound and clear, but it will mainly be useful to advanced students or to those who wish to go deeply into the subject. The introductory chapter was a good idea, and if it had been made about twice as long and a good deal more general and elementary the book might have had a much wider circle of readers. It would have been better also—in that it would have made the whole subject appear nearer the world of reality—if the author had selected as his specimen enzyme for the first chapter one of the catalysts which oxidises natural substances. It is difficult for the practically minded to be stirred by an enzyme which will only attack α-amino acids which are not found in nature.

Textbook of Histology

(8th ed.) By HARVEY E. JORDAN, Ph.D. London: D. Appleton-Century Co. Pp. 690. 35*s*.

THE general plan of this work remains unchanged. All chapters have been brought up to date and new observations have been incorporated, references being given as footnotes. The sections on technique used in the University of Virginia have been eliminated since most teachers prefer to use their own methods. In most respects the text is accurate and the illustrations are both abundant and of a high order of excellence.

Bailey's Textbook of Histology

(10th ed.) By PHILIP E. SMITH, Ph.D., RUSSELL L. CARPENTER, Ph.D., WILFRED M. COPENHAVER, Ph.D., CHARLES M. GOSS, M.D., and AURA E. SEVERINGHAUS, Ph.D. London: Baillière, Tindall and Cox. Pp. 764. 33*s*.

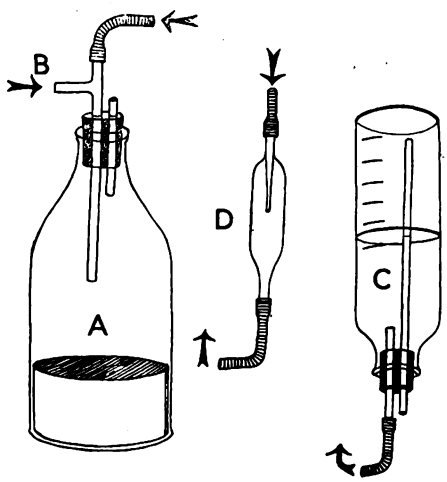
THIS edition of a well-known American book contains additional chapters on morphogenesis and on the organisation of nervous tissues. The revision of other sections has been systematic and the illustrations, which were an outstanding feature of previous editions, have been increased in number, many being in colour. Those of a diagrammatic character, representing structure in three dimensions, are of special value to the student. The text is permeated with biological and physiological teaching, thus acquiring greater liveliness and general interest than is common in histological textbooks.

New Inventions

WITHDRAWAL OF BLOOD FROM DONORS

AN IMPROVED TECHNIQUE

THE device described here has been found effective in the withdrawal of blood from donors. It consists essentially of a T-piece, the blood entering through one arm (B), the citrate through another, and the resulting mixture being delivered into the blood bottle through the third arm (A), which passes through the bung closing the bottle. The needle from the donor is connected by rubber tubing to the horizontal arm (B). A graduated reservoir of sodium citrate (C) is held in a stand about 3 ft. above the blood bottle.



This is connected through a drip (D) to the vertical arm of the T-piece, and there is a screw clip between the reservoir and the drip. At the junction of the T-piece the blood and citrate mix intimately and this makes it unnecessary to shake the bottle during the withdrawal of the blood.

The flow of citrate down the vertical arm gives a gentle suction along the horizontal arm. No other means of suction are required, for if the flow of blood slows it can be accelerated by speeding up the flow of citrate. In our experience this apparatus provides a more even and gentle suction than the method of Boland, Craig and Jacobs[1] where the maximum suction is at the beginning of the operation.

The citrate stand is put up with a sterile bowl beneath it to hold the end of the rubber tubing. The bungs with T-pieces, rubber connexions and needles are sterilised and kept immersed in a bowl of sterile sodium citrate. When the donor is ready a bung, needle and rubber tubing are taken out, fitted into the sterile bottle and the citrate reservoir connected up. The flow of citrate through the drip is normally controlled to correspond with the rate of flow of the blood.

This method has now been used in this hospital for 400 donors, and has proved simple in operation. It is of especial value when many donors are being bled in succession.

We wish to thank the medical staff of this hospital for their help, and Dr. C. J. G. Blackford for the drawing.

C. E. M. WARE, M.R.C.S.
Pathologist to Selly Oak Hospital, Birmingham;
F. MORTON, B.Sc., A.I.C.
Biochemist to the hospital.

MEDICAL AID IN THE SHELTER

FOLLOWING out the recommendations of the Horder Committee, the Ministry of Health on Nov. 12 directed that medical aid-posts should be provided in shelters (Circular 2203). Space is being screened off in every large shelter and equipment is being provided for dealing with minor ailments and accidents. Where space permits two beds and three 3-tier bunks are to be provided in the post for every 500 people in the shelter. The bunks will be placed near the unticketed bunks of the shelter proper, so that accommodation in the aid-post can be increased if necessary by moving the screen to enclose more bunks. Chairs, cupboards and bedding are being supplied either by the local authorities, or, if their stocks are deficient, by the Ministry. The medical equipment includes a fish-kettle steriliser, instruments, dressings and bandages, bowls, bedpans and hot-water bottles, a small oil-stove, a spray with a chlorine disinfectant, splints, calamine lotion and soluble tablets to make sodium bicarbonate and boracic solutions, amyl nitrite capsules, tablets of aspirin, of aspirin, phenacetin and codeine, of pulv. ipecac. co., of triple bromide and of phenobarbitone.

Another circular (No. 2217) published on Nov. 22 supplements this equipment with various preparations, some for the doctor's use and some for use either by the doctor or the nurse. The medical officer of health will guide the medical and nursing personnel in the use to be made of the mixtures. On the doctor's list the following are provided: benzocaine ear drops, procaine eye drops, linctus scillæ opiat. B.P.C., adrenaline, mist. belladonnæ co., mist. bismuthi salicyl., mist. cret. aromat. cum opio N.F., spiritus cajuputi co., tab. codein. co. N.F., tab. ephedrin. hyd., tab. glyceryl. trinit. B.P., and tab. phenobarb. The preparations for use by the doctor and the nurse are auristilla phenol. N.F., guttæ ol. ricini, linctus simplex N.F., mist. ammon. acet. co., mist. ammon. cum æther., mist. bismuthi N.F., mist. carminativa, mist. catechu co. N.F., mist. gent. cum rheo N.F., mist. magnes. hydrox. B.P., mist. sod. chlorid. co., ol. caryophylli, spiritus ammon. aromat., aspirin tablets, tab. acid. acetylsalicyl. co. B.P.C., and Brompton lozenges. The equipment seems to make a competent armoury for the treatment of minor ailments, but the Therapeutic Requirements Committee will be shaking their heads over some of the ingredients which they have asked us to avoid prescribing if we can.

1. Boland, C. R., Craig, N. S. and Jacobs, A. L. *Lancet*, 1939, 1, 388.

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THE LANCET

LONDON: SATURDAY, DECEMBER 14, 1940

DIPHTHERIA IMMUNISATION AND ITS PITFALLS

WARS are often the harbingers of social reforms, and there are indications that this one may hasten a public-health measure which is long overdue—protection of the population against diphtheria. The facts of the case are these. The average annual notifications of diphtheria in England and Wales total some 60,000, which with a fairly constant case-fatality rate of 5% means nearly 3000 deaths from diphtheria every year. By contrast, in the city of Hamilton, Ontario, (population 150,000) there have been no deaths from diphtheria since 1930 and no case has been reported since 1933. In other words, there are 3000 preventable deaths and a million pounds misspent on the hospital treatment of diphtheria in England every year. The Minister of Health has lately agreed [1] that experience in Canada and the United States shows that diphtheria can be almost entirely eliminated if the immunisation of children can be secured and maintained on a sufficiently wide scale. The crux of the problem lies in the latter part of his statement. So far, immunisation against diphtheria in this country has been left to the initiative of individual local authorities or individual enthusiasts, and, despite the protestations of Mr. MACDONALD that the policy of his department has been and is to encourage local authorities to provide facilities for immunisation against diphtheria, the Ministry of Health has not in the past given that encouraging lead which is to be expected from a department of preventive medicine. As LEDINGHAM [2] has lately remarked, "progress has been impeded by many factors, and not least by that doltish prejudice, not confined to any one social or intellectual stratum, which is fostered by anti-social societies posing as the protagonists of liberty"; and he goes on to say that when liberty is anti-social and impedes the application of scientific truth to the improvement of human well-being some form of compulsion is the only remedy. These remarks are particularly apposite to the prevention of diphtheria because unless the majority of a community is immunised protection will be inadequate and the whole scheme will be jeopardised.

DUDLEY and his colleagues [3] have convincingly demonstrated from their experience at Greenwich Hospital School and from a review of events in American cities that one effect of immunisation is to increase, at least temporarily, the incidence of carriers of *Corynebacterium diphtheriæ*, and, as a consequence, if only part of the community is immunised, to increase the risk of infection among the unprotected members. Thus, in Toronto, ROSS and MCKINNON [4] vaccinated a third of the school-children, but none of the pre-school group; there was no decline in the diphtheria morbidity although the incidence in the inoculated group fell by 80%. In Newark, where immunisation of school-children was begun in 1921, the incidence and fatality-rate for diphtheria 8 years later was the highest in the United States, the brunt of the infection falling on pre-school children.[5] A similar happening on a family scale was recently reported in our correspondence columns.[6] GODFREY [7] of New York has clearly shown that when children under five are left uninoculated it is possible to immunise over half the susceptible school-children without producing any significant decrease in the incidence of diphtheria and that when a large proportion (often put at 70%) of the pre-school children are maintained immune the diphtheria incidence will fall rapidly and ultimately disappear. Therefore, in a composite city like London—which incidentally is at the bottom of the list among the large towns in this country, with less than 6% of its child population immunised—little or nothing will be gained if a few boroughs introduce immunisation while neighbouring boroughs do nothing. Or again, when an outbreak of diphtheria has occurred in a day school, zealous immunisation of the school-children may actually cause a wider dissemination of infection among younger and older members of the community, if they are not protected at the same time.

If these are the facts, will any system of voluntary immunisation bring about effective protection of our populace against diphtheria? The results so far have not been satisfactory; Chester with 45% of its children inoculated is "probably the best immunised town in the country."[8] As a people we are too apathetic about health, and if immunisation of the community is to be left entirely to individual local authorities a great amount and variety of propaganda will have to be used at considerable expense to cajole parents to have their children immunised. There is increasing evidence from schools and other sources that many parents are willing and eager to see their children protected against the dreaded diphtheria, but only coercion will move others. And the omens indicate that the time is ripe for the Ministry of Health to launch a national campaign in favour of compulsory immunisation. More is wanted than the half-hearted effort suggested in circular 2230 issued to borough and district councils last Saturday. Since it is essential for success that the children between one and ten years of age should be immunised the help will be needed of family doctors, school medical officers and the personnel of child-welfare clinics. But the general practitioner is not mentioned in the circular although he is an integral part of any national scheme, for immunisation must begin with the year-old toddler. As regards methods, there is a variety of excellent immunising agents, of which in this country preference will doubtless be given to alum-precipitated toxoid (A.P.T.) especially for children under ten. Two doses of 0·2 and 0·5 c.cm. of A.P.T. at a month's interval is more

1. See *Lancet*, Nov. 30, 1940, p. 702.
2. Ledingham, J. C. G. *Brit. med. J.* 1939, **2**, 843.
3. Dudley, S. F., May, P. M. and O'Flynn, J. A. *Spec. Rep. Ser. med. Res. Coun. Lond.* No. 195, 1934.
4. Ross, M. A. and McKinnon, N. E. *Canad. publ. Hlth J.* 1931, **22**, 333.
5. Craster, C. V. *Med. Offr* 1931, **46**, 179.
6. *Lancet*, Nov. 9, 1940, p. 605.
7. Godfrey, E. S. *Amer. J. publ. Hlth* 1932, **22**, 237.
8. MacNalty, A. S. 1938, State of the Public Health, 1937.

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effective than two doses of any of the other reagents (F.T., T.A.F. or T.A.M.). One injection—as is apt to happen with voluntary immunisation—means insufficient protection and clinical diphtheria in the so-called immunised child. Even with what is ordinarily adequate dosage a small proportion of children may not be rendered immune, so that clinical infection may rarely occur in the immunised child, while mild atypical infection, usually with the gravis strain, has also been reported in Schick-negative children.[3] These facts should be made known in any propaganda literature so that the doctor may be prepared for such occurrences. The recent suggestion by O'MEARA[9] that the diphtheria toxoids and antitoxin at present in use are not wholly effective prophylactic or curative agents need not be taken too seriously, for experience has already shown that diphtheria can be eliminated by protective inoculation, while the failures of antitoxin usually occur in cases treated so late that the tissues are already irretrievably damaged by the toxin. The general facts of the case for widespread immunisation against diphtheria are clear; the time has come—not to talk, but to act.

ANTICIPATING DEAFNESS

THE time is rapidly passing when it could be said that the deaf are among the neglected of medicine. Deafness in school-children, with or without otorrhœa, is a serious problem whose significance has not been fully realised until recently. It is estimated in America that in 3 cases out of 4 deafness arises before the age of two years, and in 9 cases out of 10 before the age of twenty.[10] These figures justify the work and thought which are being given to the subject, for the plight of the deaf in industry and in their social existence can be tragic. The diagnosis of deafness must be made at the earliest possible moment in childhood in order that treatment may be given, and, more important, that no time may be lost before beginning special education. The question of prophylaxis involves other and non-medical factors such as poverty and malnutrition. Progress is being made along all these lines. KERRIDGE[11] emphasised the effect of slum environment and malnutrition in increasing the incidence of chronic otorrhœa in children and while this is not as fully documented as MAY MELLANBY'S work on diet and dental caries, yet the evidence is strong and has been confirmed by others.[12] Overcrowding also affects the incidence of zymotic disease and meningitis, the chief causes of deafness in early infancy. There are no data on which to adjudge the relationship between social conditions and deafness due to non-suppurative middle-ear disease, and, as far as we know, there is no connexion between them and congenital deafness. Reliable figures are difficult to obtain, but it is estimated that 80–90% of all cases of deafness are due to suppuration beginning in the middle ear.

MAX GOLDSTEIN in America and the EWINGS in this country have written authoritatively on the educative problems of the deaf. Early diagnosis is necessary to get an early start with tuition. The development of gramophone audiometry has made it possible to test the hearing of a number of children simultaneously. Since CROWDEN[13] demonstrated this possibility KERRIDGE used the method to investigate a group of deaf and partially deaf children[14] and later, during the intensive study of a group of apparently normal school-children at Hendon, showed that she could pick out the deaf children with ease and rapidity. Other educational authorities have realised the value of the method and use it for routine examinations. In mass testing a few cases manage to elude detection, but this is overcome by repeated examinations. Children under seven can also be tested in this way, although not in such large numbers simultaneously. Doubtful cases in this younger group can be elucidated by individual testing. The audiometer detects deafness due to many different causes, from wax in the meatus to congenital inner-ear deficiency. LISHMAN[15] therefore maintained that routine inspection of the drums was necessary, and in a series of cases showed that systematic examination with the electric auriscope revealed nine times as many cases of suppuration as were found by external inspection of the ears. Routine examination of every child by an otologist would be ideal, but as yet no machinery exists to provide it in England; where it cannot be arranged the electric auriscope will be invaluable for the overworked public-health officer. WILKINS confirms this view and points out that in the early stages of chronic suppurative otitis media the loss of hearing is often not very great; it is the long continuance of the disease which leads gradually and irrevocably to severe deafness. Thus the audiometer and external inspection of the ears may miss an important group. While examining with the electric auriscope 2033 school-children selected at random WILKINS discovered 69 cases of active suppuration, most of them chronic and 18 bilateral. In addition, 86 other children were found to have unhealed perforations in one drum and 15 of them in both drums; in 49 other children a healed perforation was seen. The story is even then not complete because in 277 children he was unable to see one drum owing to wax, and in 91 others both meatuses were blocked; several dry or healed perforations could have been present in these 368 children. These figures give some idea of the amount of chronic suppurative middle-ear disease in school-children which normally goes untreated. WILKINS advocates the use of the electric auriscope at routine school medical inspection so that these cases can be found and treated at a stage where treatment can be effective. He has nothing to add to the accepted principles of treatment of otorrhœa recently summarised by ELLIS.[16] Clinics under the control of an otologist must be established where the children can be treated and supervised. A concentrated attack of this sort could substantially reduce the incidence of deafness. It seems hardly fair to overburden the already harassed school medical officers in the reception areas, but this problem is one of the most important they will encounter in the evacuated urban children. They might profitably adopt the approach which WILKINS suggests.

9. O'Meara, R. A. Q. *J. Path. Bact.* November, 1940, p. 317.
10. *Publ. Hlth Rep., Wash.* Aug. 16, 1940, p. 1501.
11. Kerridge, P. T. *Lancet*, 1939, 1, 1283 and 1440; 2, 781.
12. Wilkins, E. H. *Med. Offr.* Nov. 9, 1940, p. 157.
13. Crowden, G. P. *Proc. R. Soc. Med.* 1934, 27, 428.
14. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1937, No. 221.
15. Lishman, F. J. G. *Brit. med. J.* 1937, 2, 1165.
16. Ellis, M. *J. R. Inst. publ. Hlth Hyg.* 1940, 3, 281.

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BOILS

THE treatment of boils is too often based on clinical impression unsupported by scientific observation. No series of cases, adequately controlled, has given unequivocal proof of the value of any of the so-called specific treatments though every doctor can tell of some case dramatically cured by tin, yeast or vaccines. Most of these remedies have been introduced on empirical grounds; thus yeast has been used at least since 1852 when it was observed that brewers did not get boils. But even assuming that brewers eat yeast, why is it that other people who take it as a medicine usually continue to have boils? Either there is some other factor in the brewer's life which prevents boils, or else the observation that brewers do not get boils is incorrect and ought to be expunged from the literature. The same argument applies to tin which was introduced by FROUIN and GRÉGOIRE in 1917 because tinners in the Sologne were said to be immune from boils. Are they really so or is this a mere clinical impression unsupported by facts? Tin by mouth certainly does not protect all ordinary people from boils; even manganese, which was introduced by MCDONAGH also in 1917 and which has some statistical support for its curative action, only cures some cases and this may be chance. Vaccines, and more recently toxoid, have been used in a more scientific spirit but are regarded as being of little value by many dermatologists; their worth would probably have been proved beyond doubt by now had it been capable of proof. A low carbohydrate diet and more lately insulin [1] have been put forward as cures. Admittedly boils and carbuncles are more serious if the patient is a diabetic and may cause glycosuria in a diabetic who is sugar-free; here insulin may help the patient, if not the boil. But are diabetics really more prone to boils than normal people? Clinical impression says they are, but this may be because more attention is paid to a boil in a diabetic than in a normal person. Most of the figures quoted in textbooks seem to emanate from GREENWOOD,[2] yet his statement that 1·2% of diabetics had boils while attending his clinic is based on only 7 cases of boils in diabetics; his figures afford a much more convincing proof of an association between diabetes and psoriasis. Even when he takes patients who had a history of boils at any time, the figure is only 6·8%; surely 1 in 15 of the normal population has had boils at some time. It is doubtful whether the blood-sugar in normal people is affected at all by boils. From analogy with what happens in diabetics it is commonly supposed that boils lower the sugar tolerance, but the careful work of ROST [3] failed to show any alteration in the blood-sugar curves and TAUBER [4] actually cured cases of boils with large doses of dextrose.

It seems therefore that CROCKER [5] was right when he wrote fifty years ago "although internal remedies are to a certain extent useful, early local disinfection is the most efficient means of preventing constant recurrence, and if the circumstances of the patient allow of its being efficiently carried out the boils will soon cease to form." This simple advice is neglected nowadays, but more complicated and expensive measures would rarely be required if the patient was properly instructed in cleanliness and sterilisation of the skin. Irritation by dirt, sweat and friction play an important part in causation and this is why boils come where the collar rubs the neck and why oarsmen get boils where they do. Moreover a staphylococcal lesion anywhere probably causes a great increase in the staphylococcal flora of the whole skin. Patients should scrub the affected area with soap and water and an antiseptic lotion, such as lotio hydrarg. perchlor. 1/4000, three times a day till at least a month after the last boil has gone, and use a 5% salicylic-acid dusting powder; where boils are widespread they should take a daily antiseptic bath. Any obvious septic foci in teeth or nose or anywhere else should be treated. Occlusion of a single boil with elastic plaster often helps to limit the spread of infection. Where boils are localised to the back of the neck, the axilla or the peri-anal region, X-ray treatment helps materially. In the treatment of the individual boil fomentations can be abused; if left on for any length of time they rapidly become cold and merely help to spread the infection. Bathing with very hot water, dry heat or even the old-fashioned and unduly neglected suction ball, are better methods of producing local hyperæmia and resolution. If fomentations are used they should be applied three times a day for sessions of an hour, each fomentation being applied for only fifteen minutes. After local treatments the skin around the boil should be disinfected, preferably by some coloured antiseptic, such as brilliant green, powdered, and then left dry till the next session. If boils recur after careful attention on these lines it is time enough to try specific remedies. Choice of these will probably be governed by fancy and results by fortune.

1. Miller, W. *Lancet*, Sept. 21, 1940, p. 377.
2. Greenwood, A. M. *J. Amer. med. Ass.* 1927, **89**, 774.
3. Rost, G. A. *Brit. J. Derm.* 1932, **44**, 57.
4. Tauber, E. B. *Arch. Derm. Syph. N.Y.*, 1933, **27**, 198.
5. Crocker, H. R., Diseases of the Skin, London. 3rd ed. 1903, p. 218.

ATHLETICS FOR THE YOUNG

FITNESS in childhood depends most of all perhaps on good food; but it also depends considerably on the chance to be active in the open air. The report [1] of the second conference on child athletics shows how keenly, nowadays, school athletics are planned. Representatives attended the conference from four athletic associations, three bodies interested in physical education, four associations of school teachers and the Medical Officers of Schools Association. The report is intended as a guide to those responsible for the athletic training of children of school age and gives straightforward advice on the management of school athletics, including timing and marking of races, graded activity, limbering up and limbering down, the choice of sports clothing and shoes, and the value of a rub down with a towel if showers or other washing arrangements are not available. The booklet aims at stimulating the unathletic child to enjoy his share in games, at keeping the clever athletic interested, and at avoiding any undue emphasis on the success of the individual. The conference noted with pleasure, for example, a tendency to discontinue the award of victor ludorum in schools; and competition is analysed under three headings as that in which one strives to beat: an opponent; an external standard; one's own previous best. This civilised scale of development might be carried into all education.

1. London: The Ling Physical Education Association. 1s. 2d.

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Annotations

BEDS FOR CIVILIAN SICK

SINCE the beginning of the war there has been a substantial increase in the number of beds available for the treatment of casualties. In the early days beds were provided by decanting those who were occupying them. These beds could only be reserved for casualties at the expense of civil needs, and in some parts of the United Kingdom—notably, according to the Health Services' Report, in Scotland—the deficiency of hospital beds in peace-time was considerable. Large industrial areas like the county of Lanark had to depend on Glasgow for general hospital beds. There was always delay in securing necessary treatment and investigation of everything but urgent surgical conditions; such routine troubles as hernia and foot disabilities had to wait. War has exaggerated these deficiencies, and at the same time large numbers of new hospital beds, originally intended for air-raid casualties, have been provided. In some parts of the country demands on them and on pre-existing civil resources have been heavy, but it happens that this is not the case in Scotland, with the result that beds in new hospitals, generally in a country setting, are unoccupied. In some cases arrangements have been made for the treatment of service sick and casualties in these hospitals, which therefore accept service patients with hernia and dyspepsia but refuse similarly afflicted civilians, even those engaged in national work. Moreover, a soldier may be invalided out of the army suffering from chronic duodenal ulcer and be unable, on returning to civilian life, to obtain the hospital treatment which his health requires. The emergency hospitals have full medical and surgical staffs who are not fully employed, or are even left to become victims of disuse atrophy.

Lately attempts have been made in Lanarkshire [1] to gain the use of some of these beds for sick civilians, but the Department of Health for Scotland seems unwilling to concede the principle. At a meeting held in Edinburgh, attended by representatives from the department, the British Hospitals Association, the Convention of Royal Burghs, the Association of Counties, of Cities and the Association of County Councils, it was noted that during the past year some 15,000 additional beds have been provided in Scotland most of which are empty. The intention of the department seems to be that no case urgently in need of treatment should be refused admission to reserved beds; but discussion naturally turned on the definition of urgency. The secretary of the department suggested that those on the waiting-list who were engaged in work of national importance should be considered as urgent cases. It was agreed that hospital authorities were doing their best with the resources at their disposal to give such cases treatment without delay; but the fact remains that many patients whose efficiency would be increased by skilled hospital treatment are not getting it. The basic problem in Scotland is the serious deficiency of peace-time hospital accommodation. If a proportion of beds in emergency hospitals are made available for civilian sick it means, of course, a reduction in the margin reserved for air-raid casualties. The Ministry of Health is doubtless guided by the Service departments in assessing the amount of hospital accommodation to be kept open for casualties, and it may be that even yet too few hospital beds are available for this purpose; but it is obvious that plans must be made for the treatment of sickness among the general population if the country's work is to be properly done. At the end of the war the new hospitals can be incorporated with advantage into the hospital service of the country.

1. *Lancet*, Dec. 7, 1940, p. 728, and p. 756 of this issue.

SULPHATHIAZOLE AS A URINARY ANTISEPTIC

IN the nine years that have elapsed since Helmholz and Clark first applied the ketogenic diet to the treatment of urinary infections, many new and effective urinary antiseptics have become available. These advances in chemotherapy have entirely altered the prognosis in this field of medicine. Helmholz has published a series of papers evaluating the efficiency of the new drugs as they appeared, and much of our knowledge concerning their action is due to his work. When the diet was replaced by mandelic acid he produced comparative figures for the action of that acid and β-hydroxybutyric acid, and more recently he has established criteria for the effective action of sulphanilamide. His technique of investigating the effect of concentration and acidity on the growth of organisms in urine not only allows comparison of the action of any one drug on strains of various organisms but also contrasts the efficiency of different drugs. His latest work [1] has been on the efficiency of sulphathiazole as a urinary antiseptic. He has already reported [2] that this drug had proved effective in vitro against both *Streptococcus fæcalis* and *Staphylococcus aureus*. Further evidence now confirms this and is of especial interest in view of the failure of sulphanilamide and sulphapyridine to cure urinary infections caused by the e organisms.

Helmholz has established the urinary concentration and acidity required for the effective action in vitro of sulphathiazole on the various organisms commonly found in infected urine. His results suggest that the new drug is a powerful urinary antiseptic. Its action is, to some extent, dependent on the acidity of the urine; it attacks most organisms best in a neutral or slightly alkaline urine, but is more bactericidal to *Strep. fæcalis* in an acid one. This observation, if confirmed, must be accounted for in any final explanation of the mode of action of the drug. A concentration of 50 mg. per 100 c.cm. of the drug in urine proved bactericidal at any pH against *Staph. aureus*. The corresponding figures for other organisms are 150 mg. for *Bacillus proteus*, 200 mg. for *B. coli* and 300 mg. for *Strep. fæcalis*. These concentrations may be compared with the figures published by Pool and Cook [3] who, using a dosage of 4 g. a day (gr. 15 four times a day) found urinary concentrations ranging from 16·8 to 22·2 mg. per 100 c.cm. This dosage should therefore prove effective against most organisms though a somewhat higher dose may be needed to eradicate *Strep. fæcalis*. The dose of 4 g. a day is small compared to that advocated in the treatment of staphylococcal septicæmia and is the same as the dose of sulphanilamide recommended in the treatment of urinary infections.

The final evaluation of a new urinary antiseptic remains in the hands of the clinician and must always prove difficult since no two cases are completely alike. In any series of cases, while the extent and duration of the infection and the nature of the infecting organism must be taken into account, the final cure-rate will largely depend on the frequency with which either urinary stasis or impaired renal function is present. Pool and Cook emphasise, once again, that the presence of urinary stasis due to obstruction at any point in the urinary tract is a "handicap which no drug can be expected to overcome." They report a cure-rate of 65% in 50 unselected cases of urinary infection treated with either sulphathiazole or sulphamethylthiazole. This figure can, of course, be equalled or bettered by all the other new urinary antiseptics and gives no indication, by itself, of the true efficiency of the drug. Their critical analysis, however, does bring out certain advantages over previous methods of treatment. In the presence of a damaged kidney the necessary urinary concentration of the drug may be unobtainable, and Helmholz suggests that levels much over 35 mg. per 100 c.cm. are unlikely to be

1. Helmholz, H. F. *Proc. Mayo Clin.* Oct. 9, 1940, p. 651.
2. Helmholz, *Ibid*, 1940, 15, 65; see *Lancet*, 1940, I, 883.
3. Pool, T. L. and Cook, E. N. *Proc. Mayo Clin.* 1940, 15, 113.

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obtained if renal function is impaired. It remains to be seen how effective the drug is in such cases, but it should be remembered that if it is not rapidly and efficiently excreted toxic levels may build up in the blood-stream. Further clinical reports are clearly needed but it seems that sulphathiazole is no more toxic than sulphanilamide and sulphapyridine, its forerunners; it is apparently effective against a greater variety of organisms, and preliminary laboratory and clinical trials suggest that it may prove the most effective sulphonamide derivative so far available for the treatment of urinary infections.

BLUNDERBUSS VITAMINS

VITAMIN A has been called the anti-infective vitamin without producing, to the clinical eye, any outstanding evidence of its claim to the title. Dr. Ann G. Kuttner[1] refers to various studies in which vitamin A has failed to justify itself as a defence against upper respiratory infections; and gives the results of a trial of several vitamins given together in an attempt to reduce the incidence of respiratory infections in a group of rheumatic children. Such infections, especially when associated with group A beta hæmolytic streptococci, are often followed by a recurrence of rheumatic symptoms, so that any measure which offers a hope of protection is worth investigating. A group of 108 rheumatic children, 66 girls and 42 boys, ranging in age from seven to fourteen, were admitted to hospital, and divided into two groups. One group received the regular diet only and the other group received vitamins A, B complex, C and D in addition. Vitamins A and D were given in a concentrate equivalent in value to 24 c.cm. of cod-liver oil daily, and vitamin C and B complex were given in comparably large dosage. The effects were studied during two successive winters; in 1939 the vitamins were given from Jan. 1 to June 1, and during the following winter from Dec. 1, 1939, to May 1, 1940. In February, 1939, 32 children developed sore throats due to group A beta hæmolytic streptococci type IV; of these, 17 were on vitamins and 15 were not. Influenza broke out in February, 1940, and of 51 children affected 26 were on vitamins and 25 were not. Streptococcal sore throats (type XXVII) affecting 24 children between January and April, 1940, developed in 11 of those taking vitamins and 13 controls. Of the 13 controls only 1 developed a rheumatic recurrence after a latent period; and of the 11 receiving vitamins 3 developed rheumatic recurrences. There was no significant difference in gain of weight between the two groups. Dr. Kuttner concludes that no evidence was obtained to suggest that the addition of these vitamins to an ordinary well-balanced diet reduces the incidence of respiratory infections. It is perhaps noteworthy that the diet was well-balanced to start with; and it might be valuable to repeat the experiment in an institution where the diet did not deserve that description. There are still a few available in this country, whatever may be the case in America.

SPHAGNUM

IN the last war sphagnum moss was used fairly widely as an absorbent in wound dressings, and if casualties increase it may prove useful again. The large cells of the plant, which botanically lies between the true mosses and the liverworts, act as reservoirs and are perforated with small pores which allow the rapid absorption of water. Sphagnum is thus capable of taking up much more fluid than cotton-wool, in which the cellulose tubes are of small diameter, usually collapsed and twisted from drying, and incapable of filling by capillary attraction in the same way as the moss cells. A good sample of sphagnum will take up from 12 to 19 times its own weight of fluid and will hold up wound discharges until the whole mass becomes saturated. The conditions under which it is gathered and dried affect its absorptive powers considerably. It grows on damp moors and on lowland heaths and mosslands, and being easily recognised does not require experts to gather it. It is saturated with moisture when gathered and the natural impulse of the gatherers is to wring out the water before carrying the sack-load home, sometimes a distance of many miles; but this process is likely to damage the cellular structure and should be avoided if possible. The plants ought to be spread out in a sunny, airy place before the sack is filled but since this is a counsel of perfection more often than not gentle squeezing may be necessary. When the gatherers reach home the collection should be spread out on the floor of a spare attic or outhouse to dry; but if a large demand for sphagnum arises it would be better to arrange depots in which the sphagnum could be dried on wooden or canvas trays arranged in racks separated sufficiently to allow of free circulation of air. The trays could be covered with butter-muslin and their contents dried in the open. Oven-drying is quicker, but makes the sphagnum brittle and less easy to handle. It should certainly not be dried in lofts over stables and shippens because of the danger of contamination with tetanus or other organisms. Once dried it can be stored in sacks for long periods without deteriorating. When required it should be picked over and any foreign bodies likely to promote the growth of fungi and any twigs or dead leaves should be removed; it should then be packed in muslin bags of fine mesh which will guard against dust. The full bags must of course be sterilised before being distributed as dressings. Steam at high or low pressure can be used for sterilisation but it hardens the walls of the cells and reduces though it does not destroy their absorbing power; another method recommended is to charge the moss with gr. 17½ of corrosive sublimate to the pound, by soaking the bags in a solution of appropriate strength.[1] Neither method seems ideal. During the last war large quantities of sphagnum were pressed into thin sheets in a hydraulic press and though these were convenient to handle the absorptive power of the sphagnum was impaired. Moreover, dressings made from such sheets were apt to swell, sometimes when there was no chance of adjusting the bandages. Sphagnum is a more serviceable dressing in the form of loose pads. Nurserymen have long used it as a packing for plants, but it would have to be collected more carefully for use as dressings. The gathering sites chosen should be unpolluted by smoke fumes from industrial works or by brackish water; the slopes below buildings and farms should be avoided because they may be contaminated by sewage. Possibly botanical and natural history societies could combine to supply manufacturers with moss sponsored by their members.

PURSUIT OF CARCINOGENS

CARCINOGENIC agents may conceivably be produced under natural conditions in the body. Theoretically this was shown to be possible in the case of methylcholanthrene, but so far neither this nor any other carcinogen has actually been isolated. A possible source of a cancer-producing chemical might, for example, be the retained secretion in mammary glands, and a concentrated extract of such secretion might provoke tumours when brought into contact with animal tissues. Thus J. F. Menke[2] of Stanford University has made fat-soluble extracts from human primary scirrhous carcinomas of the breast and injected them into the subcutaneous tissue of mice. Since experimental work indicates that tumours may appear long after the carcinogenic agent has ceased to be applied, an extract of the tumour itself might well be a less profitable source of carcinogens than an extract of mammary secretion, a pooled collection of which might be made in any outpatient department. Menke, however, records the

1. *J. Clin. Invest.* November, 1940, p. 809.

1. *Lancet*, 1916, 1, 820. 2. *Science*, Sept. 27, 1940, p. 290.

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production of two sarcomas in two separate experiments using tumour extracts. Like many other preliminary notes his suffers from lack of a control experiment, and it must be borne in mind that natural fats and extracts from them seem often to be carcinogenic. Whether this is due to naturally contained tumour-producing agents or to subsequent laboratory treatment of the fats is still unsettled. Menke promises control experiments using fat alone. It would perhaps have been wise to complete the experiment before assuming that the fully developed tumour contains a carcinogenic chemical solely in virtue of its malignant nature.

THE PLASMA CELL

THE plasma cell with its nuclear chromatin arranged characteristically like the spokes of a wheel has long been known to be associated with certain infections, and Hynes[1] has reminded us that it often appears in the blood in german measles. But Hynes also pointed out that there was a much greater increase in cells with a different morphology which he classifies as Türk cells, and the greatest number of both cells was present in the blood about the fifth day of the illness. This parallelism between plasma cells, Türk cells, and cells described as "lymphoblasts" has been noticed before, but no definite connexion between them has been made out. Most authorities regard both plasma and Türk cells as variants of lymphocytes, but Osgood[2] postulates a separate line of development via a plasmoblast and regards the Türk cell as an intermediate form between the plasmoblast and the mature plasma cell. Moeschlin[3] has recently used the stimulation in the production of plasma cells in rubella to investigate their source and mode of development. At various stages of the illness he examined the sternal marrow and followed the changes in the lymph-glands by puncturing a gland and obtaining material for smear preparations; in two cases he also excised a gland and treated it by the usual histological methods. Glands from normal people and people suffering from other conditions were examined as controls. The lymph-gland punctures in rubella showed numbers of large primitive cells with nuclei containing several nucleoli and chromatin arranged in a network rather like that of the megaloblast of pernicious anæmia. Smaller cells clearly derived from these primitive cells were also present, and by comparing lymph-gland and blood smears he was able to make out a series of transitional forms from plasmoblast to the typical plasma cell of the blood which represents the final stage. The intermediate forms correspond to the description of Türk cells, and the cells described as "lymphoblasts" by others were probably plasmoblasts; Moeschlin differentiates clearly between plasmoblasts and true lymphoblasts. Similar cells were found in the histological sections. In support of his argument he notes that the plasmoblasts in the glands were most numerous and showed most mitoses on the second day after onset, whereas the plasma cells of all types reached their peak in the blood on the fifth day. No significant increase of plasma cells was found in the sternal marrow except in one case when a lymph-node in the marrow—such as are known to exist—was accidentally punctured.

Apparently some infections call for the plasma cells in defence, just as others call out the granulocytes or lymphocytes. When mature and immature plasma cells appear in the blood diagnosis has to be made between rubella, measles, glandular fever, and plasma-cell "leukæmia." The differences between the first two are dealt with by Hynes. The unusual mononuclear cells in the blood in glandular fever are differentiated by Moeschlin from his plasma-cell series on morphological grounds which are not very clear-cut; but it is known that glandular-fever cells appear in considerable numbers in the sternal marrow, and the Paul-Bunnell serological test is to hand when glandular fever is suspected. Moeschlin also excludes the cells of plasma-cell leukæmia from his plasma-cell family; these cells he regards, in agreement with some German hæmatologists, as "plasma-cell-like reticulum cells," normally present in small numbers in bone-narrow; he thinks that they have quite different functions from the plasma cells of lymphatic tissue, and there are structural differences as well.

Whether or not we accept the differentiation of the plasma cells of marrow and of lymphatic tissue, a case does seem to have been made out for the plasma cell's title to have a developmental line of its own and to be no longer regarded as a sort of poor relation of the lymphocyte, even though the site of its development is lymphatic tissue; and the Türk cell might be christened more informatively "immature plasma cell" or "pro-plasmocyte."

WAGNER-JAUREGG

ONE of the grand figures in the old Viennese school has lately gone to his rest. Julius Wagner-Jauregg held the university chair of neuro-psychiatry for 40 years and directed the clinic which was renamed in his honour. He did much to elucidate cretinism and wrote a textbook of organotherapy, but his name will chiefly be remembered for his introduction of malarial treatment for general paralysis. Like many other therapeutic discoveries this was to a large extent empirical and Wagner-Jauregg was probably anticipated, for certain South American tribes had long been in the habit of exposing sufferers from American leishmaniasis to malaria, and the late James Collier stated that more than a century ago in England the insane were sent to the fens to contract malaria for its beneficial results. Wagner-Jauregg's empiricism, however, was harnessed to the principle that a patient with a chronic disease might benefit from an intercurrent infection. As long ago as 1887 he proposed inoculating general paralytics with malaria, but instead used tuberculin and a large variety of other foreign proteins, and it was not until 1917 that he actually employed malaria. The result was a striking improvement in prognosis. Whereas previously few sufferers survived more than three or four years and spontaneous remissions occurred in only a small minority, malarial therapy can claim about 30 per cent. with complete and lasting remissions, and another 30 per cent. improved. These figures, as Wagner-Jauregg himself pointed out, could be greatly improved if patients could be treated at an earlier stage. The mode of action of malaria is still uncertain, though many believe that the fever is the effective factor, and that electro-pyrexia combined with Tryparsamide gives equally good results. Even if Wagner-Jauregg's discovery is thus transmuted it will remain of the first importance and an excellent example of a hunch long and patiently pursued and finally rewarded.

Dr. A. G. H. SMART succeeds Sir Wilson Jameson as medical adviser to the Colonial Office. Dr. Smart had long experience in Malaya and St. Vincent before he became in 1938 assistant medical adviser to the Secretary of State.

CHRISTMAS CARDS STRAIGHT OFF THE ICE.—Winter in Labrador and Newfoundland is a test of hardihood. The inhabitants who face it are simple people, poorly fed, some of them cripples and invalids; many of the able-bodied men have already joined the Navy, and those they leave behind will be harder pressed this winter, from the effects of their absence. For many years the Grenfell Association of Great Britain and Ireland has worked to relieve them. The Grenfell mission teaches handicrafts, and finds a market for the completed work. Friends of the association have an opportunity to help by buying Christmas cards, well-designed and free from fulsome messages, which can be obtained from the Secretary, Grenfell Office, 66, Victoria Street, London, S.W.1.

1. Hynes, M. *Lancet*, Nov. 30, p. 679.
2. Osgood, E. E. *Amer. J. clin. Path.* 1938, 8, 59.
3. Moeschlin, S. *Helv. med. Acta*, 1940, 7, 227.

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Special Articles

IMMUNISATION AGAINST BACTERIAL INFECTIONS

Being an abstract of the first Harben lecture delivered at the Royal Institute of Public Health and Hygiene on Dec. 9 by **Lieut.**-Colonel H. J. BENSTED, M.C., M.R.C.S., *late assistant professor of pathology, R.A.M. College, Millbank*

THE aim of immunisation is to increase the body's resistance to infections so that even if the public health or hygiene organisations break down the individual may be able to repel or successfully fight the infection. In immunising the armed forces and civilians it must be ensured that the particular agent employed can be readily prepared in bulk, that it is efficient in its immunising properties, and that the process is reasonably free from undesirable after effects.

The main antibodies evoked by the introduction of bacterial suspensions into the body are agglutinins, opsonins and bactericidins.

ENTERIC FEVER

Wright in 1896 first introduced typhoid vaccine by inoculating two Indian Medical Service officers with killed cultures of typhoid bacilli; he proved the immunising power of the injections by subsequently introducing living typhoid bacilli into one of them without producing typhoid fever. This vaccine, which was essentially a killed broth culture of typhoid bacilli, was later developed by Wright and Leishman and used on a limited scale in the South African War. In 1906 it was reintroduced for troops in India. The strain of *Bact. typhosum* chosen for use had been isolated from the spleen of a Gunner Rawlings, who had died of typhoid fever, and it was of comparatively low virulence. Evidence in favour of the vaccine accumulated so that, on the outbreak of the 1914–18 war, inoculation with T.V., as it was called, was a regular procedure. The vaccine was still essentially a killed broth culture and the injections were followed by a definite but transitory local and general reaction. With the addition of suspension of *Bact. paratyphosum* A and B in 1915 the present term T.A.B. vaccine was introduced; and the bacterial content was increased from 1000 million to 2500 million organisms per 1 c.cm. Later, broth was entirely eliminated and the vaccine eventually consisted of the washings of agar cultures in normal saline.

Until recent years the suitability of a particular strain for inclusion in the vaccine was assessed on its origin, motility, biochemical reactions and its rapid agglutinability by a specific serum. Stock strains were subcultured at frequent intervals from broth to broth in order to maintain motility and rapid agglutinability. This procedure enhanced the development of the less valuable H antigen but also increased the already rough tendency of the strain and did little to improve the essential O factor. By 1928 the roughness of the Rawlings strain—the chief component—had become a serious obstacle to successful vaccine production. In 1932 Grinnell showed that the Rawlings strain, as it then existed, had not the same immunising power as certain other strains. Other workers showed that the degree of protection afforded by a typhoid vaccine was largely proportional to the virulence of the culture employed for its preparation. Freshly isolated strains generally were more virulent than old laboratory strains and contained more of an extra antigen, named Vi by Felix; but methods were discovered of maintaining the virulence of strains on artificial media. It was found possible to produce a new T.A.B. vaccine of a greatly superior protective value and to ensure that this high immunising power could be reproduced in every batch prepared; this new vaccine was taken into general use in the winter of 1933–34. The reaction following its administration was perhaps slightly more severe than with that observed with vaccine prepared from avirulent strains, but when due precautions were observed most people suffered little inconvenience.

Since the last war all members of the Army going overseas have been protected against the enteric group of fevers by T.A.B. vaccine, and while abroad have been reinoculated every year; since the autumn of 1933 the whole of the British Army has been inoculated with T.A.B. vaccine prepared from proved virulent cultures. It is noteworthy that the incidence of all the enteric group of fevers in the British troops in India in 1929 was 4 per 1000, that by 1933 it had fallen to 3 per 1000 and during the next three years there was a steady decline to 1·5 per 1000.

There has been but little change in the technique employed for the preparation of the vaccine since Perry Findlay and I outlined the new method in 1934. The new Rawlings, called Raw-Ben by Kauffman, still constitutes the typhoid element, but the old classical strains of Mears and Rowlands—the paratyphoid elements—have been replaced by new highly virulent strains. The present method enables the H-antigen to persist, but no effort is made to enhance its value for it has been shown to give little protection. The O- and the Vi-antigens both appear to be essential for full protection. Under the Therapeutic Substances Act all biological preparations such as vaccines must contain some form of preservative. The Vi-antigen is much less stable than the O-antigen and is sensitive to certain preservatives such as phenol, which is still employed in the present vaccine. It is uncertain exactly how phenol acts on the Vi-antigen, for although it reduces its agglutinogenic value, its immunising power, as judged by mouse protection tests, appears to be unimpaired. Other preservatives have been shown by Felix, myself and others to leave the Vi-antigen almost unchanged, but it is not yet clear whether they can be used successfully in large-scale production. Nor is it proved that the agglutinogenic value of a vaccine represents the real protective value of the preparation. The increased immunising power of the new vaccine has not yet been proved statistically, but the fact that the incidence of the enteric diseases declined among our troops in India after its introduction, during years when there was a raised incidence amongst the unprotected civil population, is highly suggestive. It is not yet possible to give accurate figures of the incidence of the enteric fevers in the whole of our vast army to-day, but the reports so far received indicate that amongst the inoculated British troops, both at home and overseas, it is almost negligible.

The question of the inoculation of the civil population during the present war has been under consideration for some time. The general view is that inoculation of the whole population would not be advisable, but that in areas where epidemics were threatened or actually existed large-scale inoculations could be undertaken with advantage. It has been proved that the inoculation of a community with T.A.B. vaccine during an epidemic does not increase the chances of infection, as was previously thought, but gives the same protection as when employed in non-epidemic periods. The inoculation of other groups of the civilian population such as wholesale food handlers and organisations running special risks of infection is considered advisable. Already large numbers of the population have taken the opportunity for inoculation offered in various parts of the country, and the number of volunteers is steadily growing. Half the usual dosage should be given to all but the very robust. Personal experience in Thrace in 1923 of the mass inoculation of civilian refugees, many of whom were weak and ill-nourished, showed me that they were very sensitive to even the reduced dose of vaccine that was injected.

The oral T.A.B. vaccine of Besredka deserves mention; it is made up either as a bile-pill or a saline suspension for oral administration, and has been used extensively in France and in areas under French influence for several years. Reports show no valid statistical evidence that the protection it affords is comparable to that produced by the standard T.A.B. vaccine injected subcutaneously, and its use cannot be recommended.

CHOLERA

Ferran, in 1885, introduced the injection of cholera cultures. It seems that these early vaccines did not consist of pure cultures of the vibrios, and it was not until 1893 that Haffkine developed the true vaccine, originally composed of living vibrios. The modern cholera vaccine was developed from the work of Kolle and of Wright.

Gardner and others in 1935 showed that cholera and cholera-like vibrios shared a common H-antigen but that the true non-hæmolytic cholera vibrios in the smooth phase contain a heat-stable O-antigen that is specific and it is this antigen that is of importance in the immunising process. For the

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preparation of the modern cholera vaccine it is usual to employ only the classical strains of Inaba and Ogawa which contain the important antigens. The cultures are seeded on to the surface of an alkaline agar medium and after incubation for 24 hours at 37° C. the growth is washed off in normal saline and killed by heat at 53° C. The suspension is generally adjusted to contain 4000 million organisms per 1 c.cm. in saline with a final concentration of 0·5% phenol. The inoculation, consisting of 0·5 and 1 c.cm. injected subcutaneously at ten-day intervals, rarely gives rise to more than a very mild local reaction.

There is no definite proof of the value of cholera inoculation, but there are strong suggestions that it does produce an immunity of rather short duration. It is usual, therefore, to undertake such inoculations only when an epidemic threatens or actually makes its appearance, but it is sometimes employed when troops are proceeding to an endemic area; if so the men are reinoculated every six months.

In the last Balkan war cholera was rampant outside Constantinople and certain other areas and the Turkish troops suffered severely. When British and Allied troops occupied similar areas, after the 1914–18 war, the danger of an outbreak was considered. I prepared hundreds of litres of cholera vaccine, and a great many men were inoculated but no cases of cholera developed. Large quantities of cholera vaccine have been prepared again for this war, and are available for immediate use. The life of the vaccine is uncertain, but stored under suitable conditions is considered to retain its potency for two years. The stock will therefore be turned over and augmented as required. Cholera vaccine has been employed for the protection of the civil population for many years in India, and some hundreds of thousand inoculations are carried out whenever an epidemic threatens. Besredka's oral vaccine has considerable vogue in some parts but the dread of cholera is so great that the civil population submit willingly to the subcutaneous method of administration. In the past large religious pilgrimages to Mecca and Medina were responsible, owing to the lack of hygiene and organisation, for many serious epidemics. In recent years, however, strict control, including mass inoculation, has been imposed on the pilgrims passing through Egypt. In my experience the vaccine is of value in protecting the pilgrims during such gatherings.

PLAGUE

Immunisation against plague by the inoculation of bacterial suspension of *Past. pestis* dates from Haffkine's work in India in 1897, since when it has been practised on an enormous scale. This vaccine was prepared by growing a virulent strain of *Past. pestis* in a mutton or goats broth medium at a temperature of 25° C. in the dark for 6–8 weeks. It was sterilised by heating at 55° C. for 15–20 minutes, and preserved in 0·5% phenol. The dose was 3–4 c.cm.

In places other than India the Kolle type of vaccine was employed. That is to say the organism was grown on either ordinary nutrient or enriched agar at 37° C., the growth scraped off and suspended in normal saline, and killed and preserved in the usual manner. The dosage recommended varied between 1000–2000 million organisms for the initial injection followed by a second dose of double the strength after ten days. Schütze has demonstrated that, while the somatic antigen is heat-stable there is also a thermolabile surface or envelope antigen, only fully formed if the organism was grown at 37° C., and that suspensions grown at this temperature possess the maximum amount of this surface antigen. Vaccines prepared from such cultures have been found to have a much greater immunising power than those grown at the lower temperature. Recent work has been undertaken at the Haffkine Institute by Sokhey and his fellow workers with a view to preparation of the vaccine in India.

In spite of extensive field trials of plague vaccines it is difficult to assess their value, but Taylor's report to the Indian Plague Commission suggests that the Haffkine vaccine confers about a four-fold protection against attack. It is possible that the vaccines prepared in the light of recent knowledge may have a greater protective value but figures are not yet available of any field trials of these preparations. Although plague is endemic in many parts of the Middle East where our troops are operating it is unlikely that they will be seriously exposed to the risk of infection in the dispositions they occupy. Nevertheless the possibilities, remote as they may be, have to be considered and to this end arrangements have been made for large stocks of plague vaccine to be available. The vaccine will be held in readiness and will not be employed on any large scale unless a serious outbreak is threatened.

SCOTLAND

CIVILIANS IN EMERGENCY HOSPITALS

THE controversy mentioned in this column last week regarding the use of empty emergency hospitals for ordinary civilian patients has been widened. Lord Craigmyle has spoken and written to the press appealing for more extensive use to be made of these hospitals so as to reduce the large waiting-lists of the voluntary hospitals. The number of patients waiting for admission has not declined since the war started and the reduction of available beds in the voluntary hospitals has reduced the speed of turnover. It has been said in reply that no urgent civil case need be refused admission to emergency hospitals, but in practice the beds have in general been kept empty. However, the plea is that they should be used not only for urgent cases but for the treatment of mainly surgical patients who might be relieved or cured of more chronic conditions and thus made active economic units in the population again. The value to the E.M.S. of keeping its staffs occupied on active medical and surgical work has repeatedly been pointed out.

THE BASIS OF TEMPERAMENT

Dr. A. Ninian Bruce, giving the Honyman Gillespie lecture on Nov. 21 at the Royal Infirmary, Edinburgh, said that temperament is the mental constitution of a person, just as physique is his bodily constitution. It controls mental life, which is the reaction to the external environment. As nervous tissue evolved the increasing demands upon it were met not by an increased complexity of the tissue itself, but by the formation of completely new tissue which carries out not only the functions for which it has been developed, but also many of the functions of the older parts of the nervous system. In the brain of the fish the cerebrum forms only a very small part while in man it forms the major portion of the brain. The nervous system can only react in response to a sensory impulse—it is purely a system of reflexes. The reflexes in the older type of brain, however, differ entirely from those in the more recently evolved brain. The older brain shows rhythmic activity in the cardiac and the respiratory centres, but otherwise it responds in a fixed and rigid manner to the impulses it receives. These reflexes are present at birth, are constant to the species, and cannot be altered; they are unconditioned reflexes and their summation forms the hereditary instinct of the animal. The more recently developed nervous system, though it also reacts in a reflex manner, does it by means of the conditioned reflexes; and these reflexes are not present at birth and are different for each individual animal. Dualism—the separation of mind and body—can no longer be sustained, he considers, for "mind" is only the summation of the conditioned reflex activity of the cerebral cortex.

Conditioned reflexes depend in the first place on an unconditioned reflex and in the second place on such sensory analysers as sight and hearing. The senses bring the animal into close association with its environment. In man the process has reached a further stage, another set of analysers has been added to the senses, situated in the frontal lobe of the brain. By means of them man can master the environment and use it to his own purpose. Conditioned reflexes are unstable, vary with the environment, and can be easily extinguished. They may be excitor and inhibitor reflexes. The spread of the inhibitor reflex to a stage of complete inhibition leads to negativism, which is the outstanding feature of the melancholic. Pavlov noticed, during the research on inhibitory conditioned reflexes, that animals tended to fall asleep during the experiments, and this led him to postulate that sleep was due to spread of the

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inhibitory process throughout the cerebral cortex, involving even the lower centres; if the inhibition only affected the cerebral cortex a state of hypnosis developed.

From further experiments it appears that inhibition is not merely a cessation of excitation, but an active process in itself; animals are of two types, those in which conditioned reflexes can be established easily and just as easily extinguished, and those in which reflexes developed with difficulty but once established tended to remain fixed. Temperament appears to be the balance between these types. Every person tends to lean towards either the excitatory or inhibitory type. The factors deciding to which type any individual belongs are at present unknown, but they appear to be inborn. It has now been proved that in the autonomic nervous system response to the nerve impulse is produced by the liberation of either acetylcholine or adrenaline. It may be that in the cerebral cortex the liberation at the synapses of two drugs of antagonistic action decides whether the temperament of the individual will be of the excitatory or of the inhibitory type.

SHOCK

In the next lecture of the series, that on circulatory collapse and wound shock, Dr. John McMichael said that there were three types of wound shock which he had encountered as a result of air-raids. In the first, shock was due to plasma loss. In these cases the hæmoglobin rises to 140–150% and the plasma proteins also show concentration. An albuminous fluid exudes from the capillaries in the damaged area and may contain as much as 2% of protein. This type occurs mainly as a result of severe and prolonged crushing under fallen masonry. Treatment is difficult because transfused serum continues to be lost and local œdema may become so tense as to cut off the circulation to the limb. Surgical release of tension is then imperative though in milder cases elevation and bandaging of the limb may be useful. A kind of "late toxæmia," similar to that met with after burns, is encountered in this type of case, with a rising blood-urea and other biochemical changes, and it is likely to be fatal. In the second type, which includes the majority of cases, the shock results from simple hæmorrhage either externally or into a traumatised area. This has been shown by findings at operation (large hæmatomata and so on) and by the general course of the condition which is somewhat similar to that following gastro-intestinal hæmorrhage in civil practice. The third type arises from combined hæmorrhage and loss of plasma. In some cases in which hæmorrhage is the main factor patients may fail to retain transfused serum. This is revealed by a rising hæmoglobin after an initial fall due to dilution. Quantitative studies of blood-volume demonstrate that the average loss of blood is about 2 litres when the blood-pressure has fallen to 90 mm. Hg., and 3–3·5 litres when the pressure is down to 60. The cardiac output may fall to half the normal value with a blood-pressure of 90; below this pressure the oxygen supply to the tissues must be seriously jeopardised. The pulse-rate is only a rough guide to the severity of shock, for it seldom exceeds 120 even in severe cases, and serious shock may be present with a rate of 80–90. Low pulse-rates also occur in primary shock which is similar to a long faint, and the mixture of primary shock due to nervous influences and true secondary shock may sometimes produce confusing pictures. Treatment should consist of early and adequate transfusion. Where the blood-pressure is below 100 mm. Hg. a transfusion of at least 1·5 litres is usually required, and the only safe clinical guide to adequate treatment is the blood-pressure which must be restored to normal and kept as near normal as possible by further transfusions if need be.

In England Now

A Running Commentary by Peripatetic Correspondents

THE disabilities of soldiers reaching hospitals in convoy from service overseas naturally differ considerably from the casual illnesses among soldiers serving in this country. Our experience of convoy patients, mainly derived from Norway, is that gunshot wounds (some 40%), frost-bite (18%) and fractures (11%) are the chief contributors to the total, with smaller proportions due to diseases of the chest, wounds other than gunshot, anxiety neurosis, surgical joint conditions and heart disease in diminishing order of frequency. Among soldiers stationed at home and admitted for the treatment of intercurrent illness, on the other hand, surgical joint conditions (11%), fractures (8%), hernias (7%) and diseases of the chest (7%) predominate, with smaller fractions represented by appendicitis, gunshot wounds, sore feet, sore backs (lumbago and sciatica), genito-urinary disease, gastritis, hæmorrhoids, heart disease and upper respiratory catarrhs. The incidence of disease in this latter group may be construed, according to the predilection of the observer, as shedding light on one or more of several problems of current interest—the conditions under which the men are housed and live, the effectiveness or otherwise of the work of the medical recruiting boards, the strain superimposed by soldiering on the ordinary wear and tear of civilian life, or the general degeneracy of the race.

A large proportion of the ordinary hospital population of large civilian hospitals are gravely ill and suffer from advanced conditions which offer little prospect of permanent cure. In a hospital like ours the great majority of the cases do offer a prospect of lasting recovery and that fact compensates for the lack of more spectacular material. Many of the patients admitted for hernia, sore feet, sore backs, gastritis, hæmorrhoids and the like would not, in fact, have received hospital care in civilian life. It is interesting to speculate on the extent to which the strain of soldiering has produced or exaggerated ailments treated in the hospital, notably foot disabilities and peptic ulcers. We have been particularly struck by the incidence of gastric and duodenal ulcer and their precursors. Young adults who suffer from "indigestion" in civilian life but are able for the most part to do their job under civilian conditions, perhaps with occasional short periods away from work, are completely incapacitated from soldiering by the conditions of Army life, whether the cause be the quality of the food, the method of its preparation, the unusual meal times, or a combination of these and other factors less easily determinable.

It follows from the nature of the bulk of the medical conditions admitted and the age-distribution of the patients, who are for the most part in their twenties, that duration of stay is not long—12% for less than a week, 30% for 7–13 days, 27% for 14–20 days, 14% for 21–27 days, 15% for more than 1 month but less than 2, and the remaining 2% for more than 2 months but less than 3. On discharge from hospital some 60% of patients are able to return to units, 7% are sent to a military convalescent depot, 28% to an auxiliary hospital, 2% to special hospital units and the balance home on being invalided out of the Army.

The relation of Army boards to the emergency hospital system that has been developed in this country raises some administrative difficulties. Many patients require, as a prelude to being "boarded out" of the Army, investigation of a type that can only be provided in a large hospital, but there seems to be a general reluctance of hospitals, and not only civilian hospitals, to become seriously involved in board procedure. It takes time to have a patient boarded and still longer to confirm the results of boarding and obtain discharge from the Army. It seems a pity to block beds capable of doing acute work while awaiting the functioning of this boarding mechanism, but it doubtless makes for convenience if boarding and subsequent discharge can be carried out at some central point. There is scope for compromise in the matter, possibly by setting aside one satellite hospital as a boarding centre for the parent hospital and its associated auxiliary hospitals, so that once any necessary specialist investigation has been carried out in the parent hospital all the administrative work of arranging boards and discharge of patients can be centralised at that auxiliary hospital, where beds are not so precious as in a hospital capable of doing acute work.

The system of treating service sick and wounded in hospitals primarily designed for civilian casualties is an

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interesting experiment. Administrative and medical and nursing staffs are in the main provided by the civil authorities, with a military registrar and a team of orderlies to look after such military matters as pay, leave, boarding and discipline. There seems to be no good reason why the two elements in such a hospital should not live together in a spirit of sweet reasonableness. Minor differences of opinion will, of course, occur, for points of view vary, but we like to think that the welfare of the patients is in safe keeping, though the standard of equipment of civilian E.M.S. hospitals sometimes falls short of that in Army hospitals of comparable size. No doubt minor administrative difficulties can be relied on to sort themselves out in the fullness of time.

* * *

Many of us living in frequently bombed areas have been trying to live as near normal an existence as possible. Being chiefly dwellers in flats of the less luxurious kind we have missed the issue of Sir John Anderson's shelters on the one hand and are not provided with elaborate reinforced communal shelters on the other. Beyond some form of window protection therefore we have decided that there is nothing more to be done about it, and, as I said above, we carry on much as before. But with this difference, that our activities are strictly domestic occupations—reading, writing, photography, &c.—and entertaining our friends. With the barrage at full blast in London it is both dangerous and wrong to be about in the streets except upon lawful occasions. The problem of seeing friends is thus resolved into a function of hospitality—an invitation to dinner must carry with it the offer of a bed. Generally speaking space is at a premium in our homes, and hosts and guests are thrown closely into contact. It is quite a test of friendship, compatibility, community of interest, or what would you, to view with pleasure the approaching visit of people who in these circumstances are to live with you for the next eighteen hours or so. It is difficult to keep up a pretence for this length of time and "duty" visits would be an intolerable bore and are just not paid or invited. In fact, perhaps for the first time, the sheep and goats among one's acquaintance become clearly demarcated, and the results are often surprising. People one has known only casually for a short time suddenly become intimates at the expense of much older friends who are found to be less desirable. In this matter as in many others the conventional shams of pre-war polite society are no longer endurable. The stern international realities, the hypocrisy with which most international relationships are tainted (widely publicised in the press of all the warring nations) have perhaps helped us to a simpler and more honest outlook upon our own affairs, and in this instance is expressed by inviting those we want to see instead of those we ought. Again, so many people we know are half homeless by the evacuation of part of their families, and so many others are in transit, that a meal and a bed are often offered to very distant acquaintances with an informality previously impossible in our highly formalised society. In these respects therefore we are returning to simpler and more spacious days where hospitality meant both more and less. Almost any passing stranger could claim a meal and a bed. And friends we really wished to see were invited to wine, dine and sleep. This is the frontiersman's attitude to his social life and obligations and it had largely disappeared from English town life. Something of it remains in the United States, especially the southern and far western areas, and it is most warming to encounter. Perhaps this recrudescence of homely "take us as you find us" manners may be one pleasing and enduring relic of the present mental and physical chaos.

* * *

A return visit of this kind was paid (with interest, for we stayed a long weekend) to a farm in Sussex. Our host, in normal times "something in the city," disclosed himself as an expert on chickens, ducks, geese, goats, rabbits, hares, cows and pigs. I was surprised to discover how ignorant I was of the habits of these various animals, and my host's eloquence on the subject (for he had a real feeling for his livestock and therefore discussed them with intelligence and sympathy) was most illuminating. I felt that the three or four days helped me to a better understanding of my own surgical problems, not from the technical point of view but as a broadening of biological outlook. The endless tales of these animals and their habits, anecdotes concerning them, their feeding problems, the effect upon them of the war which was so remote on this farm seemed to me an excellent essay on existence. The philosophy of earthy reality, which I suppose most men working and living in the country possess, is salutary and an argument against the urbanisation which has for so long been unchecked in this country. I wonder whether education along these lines would be useful in checking this process in the future. The weather was foul during my stay, but the strain of London was relieved because the sense of danger was lacking although the German raiders passed overhead all night long and even occasionally dropped their bombs on the countryside. Our first night for two months free of this anxiety (for however much the fear is hidden and disguised it is always present) was altogether delightful. It was grand just to feel like a human being once more rather than a coconut at a shy. In spite of the rain and in addition to untroubled nights this visit was memorable for the thoughts it provoked along the lines I have indicated. It is odd that my host and I had dined and wined together on many occasions over a number of years but had never arrived on such close terms as occurred during this brief stay. I can only ascribe this to the extra intimacy engendered by living under one roof resulting in unselfconscious discussion of things and ideas we really care about. Perhaps another unexpected result of the war will be a return to simpler manners and less formal relationships with our fellows.

* * *

There is a pleasant, if slightly irreverent, story about a knock-kneed man who prayed that his legs might be straightened; so fervently did he pray that he finally became bowlegged. Something similar has happened to us in this small town. Ever since the blitz started the O.C. the local A.R.P. services has been complaining to higher authority about our siren, a thin reedy affair inaudible at more than 100 yards and liable to be conveniently interpreted by the indolent as the hooting of an owl or the crowing of a cock. Higher authority has at last been goaded into action and the silence of last night was blasted for miles around by the great deep-hearted wail of a myriad decibels. The dog barked, the baby cried, my wife said "Good God," and even I, who having the clearest of consciences am therefore the heaviest of sleepers, awoke. Once awake one felt like the man in the bedroom below when the man in the bedroom above has dropped one of his shoes on the floor; there was nothing to do but wait for him to drop the other. In other words there was no point in courting sleep again till the all clear had blared forth. King Stork has come. Before long I foresee many of us longing wistfully for the quiet days of King Log.

* * *

What a glorious farce these troop inspections by military big-wigs are. All training ceases, cleaning up is carried so far that even trees are denuded of their autumn leaves so that they should not fall while the general is there. The brass eyelets and even the studs of the Army boots are polished; and the cookhouse is so spotlessly clean that one wonders when, if ever, the men will get their next hot meal. It reminds one of those military inspections of Army hospitals in the last war. There is the tale of one where an old Army matron was in charge together with a young and rather go-ahead superintendent. On the day before the hospital inspection by the D.D.M.S. the matron put each man into clean sheets with her usual orders that no-one would, under pain of being put on a milk diet, move or in any way crumple the sheets until the visitor had gone. Imagine her horror when on her final inspection just before the visit she found all the beds empty and the men sunning themselves in the gardens. "But it's unheard of!" she cried to the superintendent after he had explained that he had sent the men out to get fresh air. There was a further shock for the matron—the D.D.M.S. congratulated the joint heads of the hospital on their foresight in not keeping the men indoors on such a fine afternoon just because he was visiting them.

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Letters to the Editor

REMEMBER THE R.M.B.F.

SIR,—I thank those of your readers who have already responded to my Christmas gifts appeal, and I hope those who have not yet sent their contributions will do so as soon as possible to: R.M.B.F. Christmas Gifts, 1, Balliol House, Manor Fields, Putney, London, S.W.15. We have never failed in recent years to show our sympathy by a gift at Christmas time to our many beneficiaries and I am confident that every one of your readers will help us; but please send contributions now, however small. A little extra pleasure given this year will mean a great deal.

THOS. BARLOW,
President, R.M.B.F.

SEQUELÆ OF CARBON-MONOXIDE POISONING

SIR,—Drs. McMichael and Ruskin, in their timely paper of Nov. 30, do not comment on the latent period which may occur between the patient's apparent recovery after exposure and the development of parkinsonism or other nervous manifestations. Levy-Valensi and others (Levy-Valensi, J., Philbert, Beley, A. P. L. and Ajuriaguerra, J. *Sem. Hôp. Paris*, 1936, **12**, 141), in describing four cases, state that there may be a latent period usually not exceeding 15 days, during which the patient may appear well. G. Daumézon (*Ann. méd.-psychol.* 1936, 94, 742) records the case of a woman, aged 58, in which there was a symptomless period of 29 days before focal nervous signs developed. The longest recorded interval I was able to find, on going into this matter about two years ago, was in a woman, aged 52, who developed parkinsonism together with mental symptoms 6 weeks after exposure to the gas (Titeca, J., *Ibid*, p. 595), and I have personal knowledge of a case in which the latent period was apparently somewhat longer.

There is an extensive literature on the brain pathology of carbon-monoxide poisoning, but I have seen no entirely satisfactory explanation of this phenomenon. Its clinical and medicolegal significance is evident.

Liverpool. A. J. MCCALL.

A PEMPHIGUS-LIKE ERUPTION

SIR,—Throughout last winter I saw fairly often a curious and somewhat startling eruption. It consisted mainly of blisters, and it attacked the conjunctiva, the mucous membranes of the mouth, tongue and fauces, and the skin. In all I saw six of these cases and heard of a number of others. Perhaps they were reported on in one or more of the medical journals. A fresh case has appeared in the last few weeks.

A child of five developed conjunctivitis followed a few days later by severe stomatitis; almost immediately afterwards small bullæ appeared all over the skin. On admission to hospital the child appeared to be severely though not dangerously ill. The temperature was 103° F. There was considerable conjunctivitis, the mouth and tongue were covered with superficial ulcers and sloughs, the lips swollen and the breath fœtid. There were blisters on the penis and scrotum and similar lesions all over the surface, in largest numbers on the face and extremities. The temperature dropped steadily from the day of admission and eleven days from the onset of the illness the patient appeared to be well on the way to recovery.

In this case none of the lesions has been morphologically characteristic of any of the well-known dermatological groups; but in several of those seen last year some of the lesions clearly resembled erythema multiforme, or erythema iris. Nearly all had been preceded by flu with a sore throat, not usually severe. Some days later ulcers appeared in the mouth, especially inside the lips. The lips became swollen, and the mucous membranes of the mouth, tongue and fauces were covered with erosions and sloughs. The conjunctiva was attacked in four out of six cases and the skin in all. The genitalia were never spared, and blisters, accompanied sometimes by the characteristic target-like lesions of erythema iris, usually appeared in numbers on the extremities, and in smaller numbers on the face and trunk. In one case the mouth, penis and scrotum alone were attacked. One was seen towards the end of the attack; in the others the temperature was invariably raised during the first days but settled down within ten days. In one that immediately followed parturition the patient appeared to be dangerously ill, but like the others she recovered rapidly and completely.

Erythema multiforme is not a rare type of cutaneous reaction, and its occurrence with some frequency during a winter epidemic of sore throats would call for no comment. But it is doubtful whether attacks of such severity as those seen last winter have been met with in numbers in recent years. The stomatitis and conjunctivitis, together with the appearance of large numbers of blisters, immediately suggest the diagnosis of pemphigus. Smallpox has also been suspected. But it is all over in three weeks; moreover, the cases are so alike that having seen one the diagnosis of others presents little difficulty.

The eruption is no doubt a reaction to an infection, perhaps streptococcal, but whether it is desirable to treat the condition with one of the drugs of the sulphonamide group it is difficult to say; it does not appear to be necessary. A few of the patients received such treatment, but others recovered equally rapidly without it. The chief difficulty is in feeding during the first week.

It would be interesting to learn of the experience of others regarding these patients. Have there been cases of stomatitis alone or stomatitis and conjunctivitis without blisters on the skin; and is the prognosis invariably as good as in the cases I have seen?

Devonshire Place, W.1. G. B. DOWLING.

HORMONE ASSAY AND THE ENDOMETRIUM

SIR,—Your annotation of Sept. 7 (p. 302) suggests that Dr. Wilson and I have given only single readings when a series is needed to form a true picture of hormone secretion. But the graph reproduced in our paper[1] represents the composite results of many assays and biopsies performed on "normal" women. Such a control chart representing the standards of a laboratory in constant use may with some reason be used as a measuring stick for the classification of the results of assays and endometrial biopsies and so lead to the classification of types of endocrinopathies, peculiar to the genital tract of the human female. In the normal women certain peaks of excretion are to be observed in the appearance of the excretion products in the urine of gonadotropic principle, œstrogenic substance and pregnandiol. Thus, the excretion of gonadotropic principle occurs usually twice in the course of a menstrual cycle, about the time of ovulation and shortly before or during the menstrual flow. The œstrogenic substance reaches a peak at about the time of ovulation and there usually is a persistence of maximal amounts in the urine for some time after this. The curve of pregnandiol excretion is less constant, though in our experience maximal amounts are most apt to be present about the twenty-first day of the cycle. Because of these facts one may by proper timing secure a fair cross-section of the events of the menstrual cycle by single estimations of the three excretion products in the urine with the addition of the results of a single microscopic study of the endometrium.

Reference to table I in our paper reveals our attempt to follow out this procedure in the normal group of patients. You rightly call attention to the error that may occur if the proper timing of assays is ignored. Such a warning should be more generally heeded. When one comes to the consideration of the patient who presents some alteration of the normal physiological process, serial assays may be more necessary. However, a cross-section of the pattern of excretion of the substances in the urine, combined with the microscopic examination of the endometrium, will frequently give one a good picture of the type of imbalance that is present, a picture that will be faulty if all of the factors necessary to a complete picture are not considered. For example, in the cases of atypical uterine bleeding erroneous conclusions would have been drawn if either the pregnandiol determinations or the results of endometrial biopsy had been studied separately. Proper function of the genital tract of women probably depends more upon proper balance of all the factors involved

1. Randall, L. M. and Wilson, R. B. *Proc. Mayo Clin.* June 26, 1940, p. 401.

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than any adherence to certain levels of function of the factors involved, a fact that has been repeatedly emphasised by several authors.

To us the most interesting aspect of this study is the suggestion that the endometrial glands exist as a definite though temporary endocrine organ possessed of all the possibilities of variation in function inherent in all glandular tissue. True, its very existence depends upon the proper stimulation and conditioning from the internal secretions of the ovary, but once so developed it may well play a part in the normal physiology of the genital tract as yet undetermined. The possibility that the endometrium cannot be considered as merely an end-organ whose sole function is to react or not to react to ovarian stimulation cannot be overlooked.

Mayo Clinic, Rochester, Minn.
Oct. 17, 1940. L. M. RANDALL.

ASCORBIC ACID AS AN INDEX OF NUTRITION

SIR,—I find it hard to accept Dr. Todd's criticism in THE LANCET of Nov. 23 that I should have been satisfied with less than the League of Nations standard for the vitamin-C requirement, or to agree with him that scurvy is due to respiratory catarrh plus toxic factors in food. Dr. Todd is right in saying that an intake less than the standard does not necessarily result in scurvy, but what he fails to recognise is that there is such a thing as undernutrition without obvious scurvy, marked for example by inadequate osteogenesis and delayed healing of wounds (an important consideration just now), or that if the reserves are allowed to sink low scurvy itself may supervene with unexpected and unfortunate suddenness. Before vitamins were discovered each of the deficiency diseases, including scurvy, beri-beri, rickets and pellagra, had been attributed to "toxins" in spoiled food. The theory had to be abandoned for scurvy when it was shown, 20 years ago, that the disease could be produced experimentally *on any diet* provided it lacked vitamin C, and irrespective of the inclusion of any supposed toxic ingredient.

Apparently Dr. Todd is not prepared to accept scurvy in the guineapig as the equivalent of human scurvy, but I know of no valid differentiation; certainly the bare amount of the vitamin needed to prevent scurvy in a guineapig is far from enough for ideal nutrition, as measured for example by growth or dental structure.

Nutritional Laboratory, Cambridge. LESLIE J. HARRIS.

SULPHONAMIDES APPLIED LOCALLY

SIR,—I have been using sulphanilamide locally since the beginning of the blitzkrieg and here is my experience.

I was recently confronted with an early large open injury of the knee-joint with some fracturing of the outer periphery of the articular surface of the femoral condyle, with exposure of cancellous bone which was obviously soiled with foreign material; on completion of thorough surgical toilet a teaspoonful of sulphanilamide (Streptocide) powder was introduced and the joint capsule closed in one layer. The superficial tissues which were widely avulsed were heavily impregnated with the powder and dependent drainage instituted at three points by strips of rubber dam and then closed with a firm pressure bandage, the limb being immobilised on a Thomas splint with 10 lb. extension. The after progress could be compared with a routine cartilage excision. The local powder was supplemented by 1 tablet M. & B. 693 4-hourly for one week.

In an early large open stove-in chest-wall injury occurring in a very fat patient, suffering from pulmonary tuberculosis chiefly on the affected side and latent at the time, the wound in the pleural cavity was closed except for drainage at its most dependent site, the whole area being impregnated with 15 g. of the powder. The wound healed by primary normal union, although some mild intrapleural infection developed which was controlled by a further course of sulphanilamide internally. This patient also had a supplementary one-week course of M. & B. 693.

An extraperitoneal iliac colostomy was closed without effort to seal off the stoma during deep dissection to the extraperitoneal layer. About 10 g. of the powder was introduced between the three suture layers and two thin strips of rubber dam were inserted at each end of the wound. Routine oral administration of M. & B. was given. Normal primary union resulted.

About a teaspoonful of the powder was introduced into the space left after the removal of a dirty retrocæcal appendix. The layers of the abdominal wall were also impregnated with the powder before closure. The progress was uneventful.

I have observed that a saturated solution of the powder in isotonic saline with some fine suspension has no irritating effect on the conjunctiva. From observation on these cases and numerous air-raid casualties of various types of an early nature I have come to regard local sulphanilamide therapy as complementary to thorough surgical treatment. Oral therapy in addition probably augments the local action and creates a second line of defence in case the infection gains a foothold. Where infection has become established internal administration plays the major role.

It seems reasonable to think that local therapy will develop an important place in the surgery of contaminated joints and of the pleural and peritoneal cavities; also in the surgery of the colon and rectum, especially for injuries whether extra- or intraperitoneal, which now have a high mortality-rate.

County Hospital, Dartford. STEPHEN EISENHAMMER.

CALCIUM AND DIGITALIS

SIR,—In his article of Oct. 12 (p. 452) Dr. A. S. Rogen drew attention to the danger of giving calcium gluconate intravenously to digitalised patients. Dr. Herles and I were interested in this question some years ago. The action of calcium on the cardiovascular system has been investigated by many workers both in animals and in man. In dogs the intravenous administration of calcium produces hypertension and vasoconstriction, its action being similar to that of sympathetic stimulation. Hazard and Wurmser[1] explained this effect as being produced by a discharge of adrenaline, and they observed that in adrenalectomised dogs calcium injections had no effect on the vascular system. There was, besides, a direct action on the heart muscle, producing increased amplitude of the auricular and ventricular contractions. This effect persisted even in adrenalectomised dogs. Berliner[2] pointed out that calcium has a direct effect on the myocardium in man, shown in the electrocardiogram by progressive changes in the P and T waves (inversion of P, flattening followed by inversion of T and by bradycardia). These changes were demonstrable four seconds after the end of the injection. The T-wave change was the most constant, appearing in all but 0·2% of the cases; bradycardia came next in 67%; and the changes in the P wave last in 54%. The changes were less marked when the injection was given slowly.

In clinical practice calcium injections are harmless, even in large amounts, when given slowly. The toxic effects arising from use of digitalis and calcium combined are due, in my opinion, to a raised digitalis action resulting from the synergistic effect of calcium and digitalis, so that the two drugs have an additive effect. Gold and Edwards[3] in their studies on dogs arrived at the conclusion that hypercalcæmia greatly increases the susceptibility of the heart to the induction of idioventricular beats by ouabain. Billigheimer[4] observed that intravenous calcium produced bradycardia, which reached its lowest point within 2 or 3 minutes and lasted 25 or 30 minutes. When the same injection was given to a digitalised patient, however, bradycardia lasted from 4 to 5 hours. Billigheimer explained the bradycardia as a vagus effect and supported this view by his observation that adrenaline tachycardia was stopped by calcium, while tachycardia produced by atropine remained unchanged.

Cases of congestive heart failure refractory to digitalis may show a considerable improvement when intravenous calcium gluconate is given as well. It is possible that in these cases there is a transient disturbance of the calcium-potassium equilibrium which is restored by the administration of calcium. In a few cases of congestive heart failure refractory to digitalis treatment in which we determined the blood calcium, expecting to find

1. Hazard, R. and Wurmser, L. *C.R. Soc. Biol. Paris*, 1936, **122**, 1181.
2. Berliner, K. *Amer. J. med. Sci.* 1936, **191**, 117.
3. Gold, H. and Edwards, D. J. *Amer. Heart J.* 1927, **3**, 45.
4. Billigheimer, E. *Klin. Wschr.* 1929, **8**, 724.

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hypocalcæmia, the calcium level in the blood-serum was not much changed, but the level in the serum is not necessarily a reliable guide to the concentration in the tissues. On the other hand, in a relatively high proportion of cases of chronic nephritis hypocalcæmia is found,[5] and congestive heart failure associated with chronic nephritis is often refractory to digitalis treatment.

Combined digitalis and calcium therapy may be beneficial in certain cases, but special care must be taken with the dosage of digitalis, because it cannot be predicted to what extent calcium will sensitise the heart muscle to that drug.

London, W.2. P. SZEKELY.

THINGS TO COME

SIR,—Mr. Aleck Bourne's stimulating letter of Nov. 23 provokes thought which I hope will lead to action. He suggests that the medical profession can coöperate in bringing in the new age that is breaking on this troubled world. Signs are not lacking of the growing consciousness in the profession of our responsibility for more than the physical condition of our patients. That a new level of health both for the individual and the world is desirable will be agreed by all; the problem is how this can be brought about.

Mr. Bourne emphasises the need for our coöperation in accordance with the demands of the changing world. What are these demands? Does not the world demand that men and nations should know how to live free from the forces of greed, selfishness, fear, domination and destructive competition? If we were to show that such a life is not only possible but practicable and results in a new quality of health, would not this point the way to the new order? In my own practice I have seen this happen on a small scale. I have seen enough examples to convince me that change in personality is a potent factor in creating a new world order. Individuals once dominated by fear, selfishness, greed, duplicity and irresponsibility become fear-free, unselfish, truthful and responsible with a corresponding improvement in their own health and the health of their social unit. Investigation into the methods and mechanism of personality change would be a fruitful field of research and a first step in preparing for this new health. It would provide the practitioner with the means of preventing and treating the origin of much ill health as well as social and world unrest. This would be a remedy for a sick world which the medical profession is in a position to apply.

St. Albans. E. E. CLAXTON.

SIR,—Perhaps you will allow me to reply to some comments, personal to myself, in recent letters in your columns.

1. Sir Francis Fremantle is a medical officer of health. In the House of Medicine there are many mansions; one of these is occupied by the consultant section of the profession; another of equal status, but with diametrically different outlook, by medical officers of health, who are salaried members of a State medical service whereas consultants, who mostly staff the voluntary hospitals, are as a body opposed to an extension of state service which would necessarily destroy the voluntary principle in medicine. The death of Colonel Sinclair, deeply regretted by his colleagues, removed from the Parliamentary Medical Committee the only member, other than myself, belonging to the consultant section of the profession, which is, I repeat, inadequately represented at the moment on that committee. Sir Francis writes: "Parliament does not believe in proportional representation of interests on advisory bodies." Surely the facts are precisely opposite. In appointing selective committees of the House (a category which does not include the Parliamentary Medical Committee) the most meticulous care is exercised to secure the strictest "proportional representation" of opposing interests.

2. A "select committee" of the House fulfils the functions and enjoys the sanctions of a judicial body. Its verdict must outweigh the opinion of any private individual. The Select Committee on National Expenditure thus records its summing up of the genesis of the E.M.S. (8th Report, p. 10).

"The scheme for an Emergency Medical Service was worked out in the spring and summer of 1939 after long discussions with the Central Emergency Committee of the British Medical Association (which became after the outbreak of war the Central Medical War Committee) and a special sub-committee."

I readily accept the correction by this committee, where correction is necessary, if any statements I may have previously made on this subject, and I submit that Dr. Scott Stevenson must do likewise.

3. In opposition to my friend, Dr. Geoffrey Evans, I submit that the Royal College of Physicians of London is wholly justified in deprecating the planning commission proposed by the B.M.A., an outline of which was given, from inside knowledge, by Sir Francis Fremantle in debate in Parliament (Hansard, Oct. 17, col. 887). The arrangements contemplated would clearly assign to the B.M.A. the dominant rôle in moulding the medical services of the future.

Wimpole Street, W.1. E. GRAHAM-LITTLE.

FISTULA OF THE PENILE URETHRA

SIR,—Prof. Grey Turner's radical cure of a penile urethral fistula (*Lancet*, Nov. 23, p. 649) reminds me of a case I operated on about sixteen years ago. An oval incision a few millimetres away was made enclosing the fistula in such a way that the latter lay somewhat distal to the centre of the oval—i.e. the proximal future flap was larger than the distal. The skin was dissected up to the edge of the opening and turned as a cuff into the urethra, the upper longer flap overlapping the lower. The fistula was then closed transversely with catgut without entering the mucosa and the skin with silkworm gut. As far as I recollect a rubber catheter was left in for a few days. No leakage of urine occurred and the wound healed quickly.

Birmingham, 16. J. W. RIDDOCH.

ANÆSTHESIA FOR CHEST INJURIES

SIR,—Writing in your issue of Nov. 30 on anæsthesia in chest injuries Dr. Halton says, "Ether must be used whenever possible, but when there is excessive bronchial secretion or excessive interstitial inflammation, or when diathermy has to be employed, chloroform is indicated . . ." He makes no mention of intravenous anæsthesia, which, combined with endotracheal insufflation of oxygen under pressure, supplemented by nitrous oxide if necessary, I have found excellent. It avoids the irritation of ether and the toxicity and depression of chloroform. In Venesetic (sodium iso-amyl-ethyl-thiobarbiturate, P.D. & Co.) I have found the ideal anæsthetic for emergency thoracic surgery. This agent, despite the warning issued in the manufacturer's pamphlet, does not seem to cause respiratory depression in doses adequate to give proper relaxation for intubation, either "blind" or under direct vision, nor does it seem to be unduly toxic. I find 6 to 10 c.cm. of a 7·5% solution sufficient for induction, and after intubation I give either gas and oxygen or oxygen alone under pressure, with fractional venesetic as required. If an intravenous blood- or saline-drip is in progress, venesetic is given into the rubber lead just proximal to the cannula, through a small serum needle.

By this method anæsthesia is induced smoothly in a patient whose respiration is already embarrassed and who fears the further embarrassment of a mask, and peaceful sleep for 1–2 hours often follows the operation without further sedatives. I have had little trouble from laryngeal spasm in these cases. Incidentally, I have used intravenous induction followed by endotracheal gas and oxygen, with or without ether, for several years in burns or scalds of the face to avoid further trauma to an already vesicated surface by pressure of a mask.

Redhill County Hospital, Edgware. UNA M. WESTELL.

HÆMOPHILIA AND EGG-WHITE DERIVATIVES

SIR,—In the review of my book on page 454 of your issue of Oct. 12, it is stated that other workers in this country and in America have tried without success to reproduce my results. This is not strictly correct; for, while an expert appointed by a medical research body in

5. Schmitz, H. W. et al. *Arch. intern. Med.* 1926, **37**, 233.

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1939 failed to get good results (which was not my fault as I could have proved if my offer of a personal demonstration had been accepted), extremely active material was made and tested, independently of me in 1937–38, by colleagues and also by a commercial firm. So active was this material and such good results did it give that I was pressed to market it, but refused as I considered further research was required. This has now been done and the results are given in my book.

The review also implies that the bleeding crises of my hæmophilic patients may have been overcome because of their hope and faith in me, rather than because of any specific value in my remedy. The implication is silly and frivolous. Is it likely that 33 hæmophilics varying in age from 3 to 60 years would be so inspired? And what of the patients whom I have never seen? My remedy has been, and is being, sent to them by post and administered by other persons. I do not claim to be another Rasputin; but I do claim that my anti-hæmophilia remedy has a specific value, and a high one at that. Clotting times of over 240 minutes have been lowered to less than 10. None of the 33 cases recorded in my book has failed to benefit, prophylactically or during a crisis, from my treatment.

Your review ignores the anti-coagulant, bactericidal, and non-retractile-clot forming effects which are, in my opinion, of even greater importance than the coagulant effect; and, what is more, they can be tested in vitro. There is no mystery about the remedies. In my book I have given the processes and all who care to can make them. If some workers have failed to reproduce my results, the fault is theirs. I am willing to show them, personally, and to coöperate in any way desired.

Sheffield. W. A. TIMPERLEY.

NOT TOO PROUD

SIR,—In your issue of Nov. 30 one of your peripatetic correspondents saw fit to sneer at the medical student in casualty and clearing stations. The student is, he said, "too proud to carry stretchers and not qualified to sign a death certificate." The latter fact is obvious enough, but has he himself always enjoyed that final privilege? "Too proud" was not the phrase used by the authorities of the most severely damaged of the London hospitals when they wrote in grateful acknowledgment of the way in which students had sweated through the night to restore order from chaos. It would indeed be hard to realise that they were talking about those useless objects, medical students, for they seemed to regard their squads of stretcher-bearers, fire-watchers and odd-job men as curiously helpful. Students cannot sign death certificates—and is that, after all, a doctor's major function in an air-raid?—but they can and have humped beds and patients from wards to buses and back again, stitched up the minor injuries, and slept on the basement floor, nor have they escaped unwounded in the process. It may be that your correspondent intended his remarks to apply only to his own students; in that case one can only sympathise with him and with his hospital in their mutual misfortune.

Guildford. R. A. D. CRAWFORD.

SIR,—The students at the hospital of your peripatetic correspondent must be a poor lot if they are too proud to carry stretchers. With memories of carrying heavy and unconscious patients down into our basement theatre and back again to bed, loading the evacuating ambulances, and at the start of the blitz helping to carry a patient in bed fitted with a balkan frame extension down three floors while the bombs were dropping, I feel that he should have visited hospitals other than his own before making so sweeping a statement. Moreover, at my hospital, we do more to some casualties than sign their death certificates. Students in rota take a full part in transfusion units, theatre teams, and so on, and most of the heavy labour is left to them, including stretcher-bearing, fire-fighting and even scrubbing unrecognisable casualties or sorting out their various components. I agree that an advanced dressing station is no place for students, but certainly not because they are lazy. The passing of exams is now more imperative than ever, and the senior student cannot afford long nights on duty away from his books, a fact which our own medical school recognises when making out the duty lists. The very junior student, fit for little more than manual labour, finds it stale and unprofitable when examiners and common sense demand that he shall gain experience on cases other than casualties, whose treatment should occupy only a small part of his curriculum; but I have still to see hanging back on the part of any of them when there is heavy and unprofitable work to be done.

London. SAM WELLER.

SIR,—The remark of your peripatetic correspondent cannot pass unchallenged. I have seen no such perverted pride among my colleagues in a London teaching hospital. In September, 1939, the building was cleared of inpatients by student volunteers; and when in one week three bombs did much damage to the fabric the students sleeping on the premises set to as stretcher-bearers and dressers without orders or delay. In emergencies we are not "too proud" to do anything, but we do realise that this unskilled work does not help us in the examination halls. We pay fees to be taught the rudiments of the art of medicine. The syllabus is still overcrowded, and nothing has been more aggravating than the breaks in teaching and the lack of clinical material caused by war. Naturally we do not wish to lose time in acquiring that ability and recognition which will allow us to combat the havoc of bacterium and bomb. Our job is to learn medicine and we ought to be able to leave less skilled work to others.

C. B. B. D.

SALT AND CHILDBIRTH

SEVERAL workers have reported that labour is shortened if the mother takes a diet low in salt during the latter part of pregnancy. Wadlow, whose experience was reviewed [1] in our columns earlier in the year, found that in a series of 70 pregnant women (45 primiparas, 25 multiparas) taking a low-salt diet, the length of labour averaged 6·9 hours in primiparas and 4·3 hours in multiparas. The corresponding figures for 100 primiparas and 100 multiparas and on an ordinary diet were 13 hours and 7·9 hours. William Pomerance and Isidore Daichman now report [2] a further series of 78 cases—51 primiparas who averaged 9·9 hours in labour and 27 multiparas who averaged 5·8 hours. In order to ensure a limited salt intake during the last weeks of pregnancy these workers urged a salt-free diet on the mother as soon as she had got over the vomiting of the early months, and continued to exhort her at every antenatal examination, presumably successfully. In a control group of 49 patients on a conventional diet the average length of labour of primiparas was 22·9 hours (33 cases) and of multiparas, 9 hours (16 cases). In the absence of experimental data the authors conscientiously refuse to discuss the explanation—"whether it is the reduction of the fluid content of the uterus, the greater softening of the lower segment of the uterus, a lowering of the threshold of the consciousness of uterine contractions, thereby decreasing the conscious duration of labor, or the greater frequency of Braxton Hicks's contractions resulting in more dilatation of the cervix prior to the onset of labor or any other mechanism that may be thought of . . ." At any rate they have set out a fair programme for a keen researcher. Wadlow favoured the view that by restricting salt it is possible to limit to some extent the fluid retention which occurs in the late stages of pregnancy. The uterine muscle is one of the reservoirs of fluid, and may possibly be hampered in labour by physiological œdema; if fluid retention due to salt is eliminated the uterus may come to its athletic task in better training.

In comparing the two sets of cases it is noteworthy that the average times of labour are higher in all groups in Pomerance and Daichman's series than in Wadlow's, which suggests that opinions differ about the point at which labour can be said to have begun. This, of course, does not affect the comparison in either series, and these observers have given good evidence that restriction of salt in pregnancy really does reduce the average length of labour.

1. *Lancet*, 1940, 1, 1091.
2. *Amer. J. Obstet. Gynec.* September, 1940, p. 463.

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Parliament

THE solid advantages of a responsible and free parliament in the midst of a great war were strikingly illustrated last week when one of the most dramatic debates of recent times took place on an amendment to the Address moved on behalf of the Independent Labour Party by Mr. McGovern. This member and his two other Clydeside colleagues, who openly argued in favour of a negotiated peace with the totalitarian powers, were trenchantly answered in a number of brilliant speeches and finally ignominiously defeated in the division lobby by 341 votes to 4. Actually two members of the official Labour Party, and the sole representative of Communism in the House voted for the peace amendment, but the total peace vote was reduced to 4 by the deduction of the tellers' two votes. The basic proposal of the amendment was that the British Government should declare peace terms and call an international conference to bring the war to an end. Mr. McGovern was given an attentive hearing, and his tribute to the members of the House who had thought it their duty to fight—particularly the late Sir Arnold Wilson—drew forth approving cheers, but when he went on to argue that we were fighting not for freedom but for the capitalist class it was evident that almost the whole House was ranged against him. Indeed some of the most effective speeches against the amendment came from the Labour benches. It was a tense and dramatic moment, for example, when Mr. Thurtle, Socialist member for Shoreditch, compared Mr. McGovern and his friends to industrial blacklegs. They were ready, he said, to reap the reward of other people's sacrifice, but were unwilling to take any part in the fight. Even blacklegs had not the audacity to lay down terms of settlement in a dispute in which they had refused to take part.

* * *

The Prime Minister did not speak in the debate, though he was present during its later stages. It was left to Mr. Attlee, the Labour Party leader, to speak for the Government, and he did so in vigorous fashion. The House cheered when he called attention to the fact that no other country at war would tolerate such a debate. It was an evidence of the strength of our democracy that ideas so repugnant to the overwhelming majority of the House and the country could be listened to with toleration and openly replied to. Mr. Attlee dismissed the idea that by a few nice phrases we could loosen the grip of Hitler either on his own people or on those of the enslaved countries. Hitler was offered a conference before he attacked Poland but he refused it. The main difficulty of this struggle was that we were up against people who did not accept the beginnings of the decencies of our modern civilisation. They had destroyed freedom in Europe. There was a definite conflict between two different conceptions of how our affairs should be carried on. The Government could not be expected to give a detailed exposition of war aims on an irresponsible motion of this kind. We were asking for an ordered peace based on social justice.

QUESTION TIME

Medical Register and Friendly Aliens

Sir HENRY MORRIS-JONES asked the Home Secretary whether, considering the great need for additional trained medical personnel both for the services and civilian life, he would sanction, for the period of the war, the entry to the Medical Register of doctors of allied countries fighting with us, who were of proved medical attainments and bona fides, in view of the fact that there were in this country at present many physicians and surgeons of European renown who were debarred from rendering the services they desired to the allied cause, and that many of them depended on charity for their living.—Miss HORSBRUGH, parliamentary secretary to the Ministry of Health, replied: The two ministries concerned are giving this question sympathetic consideration.

Synthetic B_1

Sir ERNEST GRAHAM-LITTLE asked, the parliamentary secretary to the Ministry of Food, what contracts had been placed for erecting the factory for the manufacture of synthetic B_1, for equipping the same, and for staffing the establishment; would other synthetic vitamins be manufactured here; if so, for what purpose; and, in particular, was it proposed to supply farmers and stock-breeders with synthetic vitamins in place of the natural food of cattle and other stock.—Major LLOYD GEORGE replied: The only factory which is at present capable of producing the synthetic vitamin B_1 on a scale sufficiently large for its introduction into white flour has been erected as a result of private enterprise by a firm of chemical manufacturers. I am not in a position to give details of the contracts which have been placed by the owners of the factory, nor of the staffing of the factory for neither of which the Ministry of Food is responsible. The same manufacturers are engaged in the manufacture of the anti-scorbutic vitamin, but I am not aware of any proposals to supply farmers and stock-breeders with synthetic vitamins for use as feed for their livestock.

Sir E. GRAHAM-LITTLE asked what were the firms in the milling combine doing with the valuable portions of the wheat taken out of the berry in their milling process, which contained the vitamins and mineral salts essential to human and animal health; whom were these products being sold to; at what price, and for what purposes; and would he give an assurance that none of them were being repurchased in any form by the Government for the feeding and nutriment of the nation.—Major LLOYD GEORGE replied: The operations of all flour millers in the United Kingdom are controlled by statutory orders which determine the conditions under which wheat flour may be milled and sold. In producing national straight run flour as permitted by general licence issued under the Mills (Four and Provender) No. 1 Order, 1939, millers generally separate from the flour fine and coarse wheat feed (also known as sharps, middlings and bran), which are disposed of almost entirely as animal or poultry food. About 95% of all the flour manufactured in the United Kingdom consists of white flour thus manufactured. The elements of the wheat berry which contain vitamin B_1 are normally included in wheat feed, but some millers extract a part of the germ separately and use it themselves or dispose of it to other millers for use in the manufacture of high extraction germ flours. The prices at which flour and germ and wheat feed may be sold are fixed by order. So far as the ministry is aware, no germ, wheat feed or other by-products of flour milling are purchased by H.M. Government for feeding the people.

Shelters

Mr. BROOKE asked the Home Secretary whether he was aware that the simplest way to fix bunks in shelters was right against the wall, but that when this was done against walls that became wet in damp weather the bunks would become unusable and be wasted because it would be impossible to keep the bedding dry; and would he issue a specific warning to authorities responsible for the fixing of bunks.—Miss E. WILKINSON, Under Secretary, Home Office, replied: In bunking public shelters special attention is being given to dampness and very damp shelters are not to be bunked at all. Proposals which are now being circulated will, if put into operation by the local authorities, do much to reduce dampness in shelters.

Mr. SORENSEN asked the Home Secretary whether he would establish standards of at least 30 inches vertical space between bunks installed in public shelters, together with frequent spaces between each range of shelter; whether the distribution of medicinal tablets or pastilles was now general; and what steps had been taken respecting the heating of shelters.—Miss WILKINSON replied: It would be impracticable to attempt to increase the vertical spacing of the three-tier bunks ordered and now being delivered; and the dimensions of shelters would in fact prevent it in many cases. Lateral spacing of at least 2 feet is prescribed. The issue of medicines and tablets as part of the scheduled equipment of medical aid-posts in large public air-raid shelters in London is well in hand. In large shelters which are well filled, heating has been found by experience not to be necessary, but measures are in hand for providing the necessary amount of heating in the brick surface shelters and in trench shelters.

Miss CAZALET asked the Home Secretary whether he would empower local authorities to engage as many additional cleaners and supervisors for shelters of all kinds as were necessary for keeping the shelters absolutely hygienic.—Miss WILKINSON replied: Instructions in this matter were issued to the local authorities in the London region in September last. The attention of the regions has also been called to this urgent matter in the areas where dormitory conditions have developed or are likely to develop.

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Mr. T. E. GROVES asked the Minister of Health how many medical practitioners had been so far appointed by the common council of the City of London and the metropolitan borough councils for the supervision of public air-raid shelters, and what steps were being taken to cause appointments to be expedited in districts where there appeared to be some delay.—Mr. M. MACDONALD replied: The number of doctors appointed to assist the medical officers of health in these areas in the regular inspection of air-raid shelters is 6, and the number of general medical practitioners whose services have been secured for attendance at shelters is 337. Medical officers of my department are in personal consultation with the medical officers of health so as to ensure that such additional appointments as are necessary are made without delay.

Non-notifiable Infectious Disease

Sir RALPH GLYN asked the Minister of Health whether any executive power was entrusted to the medical officers of health to local authorities to remove from public shelters or from billets persons who, though not suffering from notifiable diseases, yet from their condition were capable of transmitting various forms of infection injurious to other people; and whether he would consider means whereby local medical officers of health could obtain the services of persons with sanitary and medical experience to assist the medical officers to remove all individuals to places where remedial treatment could be given them.—Mr. MACDONALD replied: As regards shelters the Minister of Home Security and I have this question under active consideration at the present time. As regards billets, a local authority on the advice of their medical officer could in a case of this kind terminate billeting arrangements and offer the alternative of admission to an appropriate hospital. I am looking into the suggestion in the latter part of the question.

Food at Rest Centres

Mr. MANDER asked what arrangements had been made for the provision of meals by public-assistance committees to air-raid victims; and whether any restrictions had been placed upon their liberty to supply such food as seemed desirable.—Mr. MACDONALD replied: The public-assistance authorities provide meals at the rest centres for air-raid victims who cannot make their own arrangements for accommodation. There are no restrictions on their liberty to supply, within reason, such food as seems desirable, and they have been urged to provide at least one hot meal every day.

Milk for School-children

Sir ADAM MAITLAND asked the parliamentary secretary to the Ministry of Food if supplies of milk for school-children had been stopped and if normal supplies of milk were being maintained to ordinary households.

Rear-Admiral BEAMISH asked what steps were being taken, or were in prospect, to secure the promised priority for school-children's milk supplies; and if he was aware that in some districts distributors of milk had stated that they cannot continue to supply milk to schools.—Major LLOYD GEORGE replied: Dairymen are required to supply in full the milk required for children under the milk-in-schools scheme and for certain other classes of consumers, and to distribute the remaining supplies among other customers on the basis of 90% of their requirements. This figure is subject to frequent review in the light of the current milk-supply situation. In some areas milk distributors are finding difficulty in supplying milk to schools and for this reason he is examining the milk-in-schools scheme, in consultation with the Government departments concerned, with a view to adapting its conditions to the special circumstances of war-time.

Hessian Canvas for Glass

Sir FRANCIS FREMANTLE asked the Home Secretary whether, in view of the successful use of Hessian canvas in a hospital of which particulars had been sent to him, he would recommend the removal and storage of glass wherever practicable, and the substitution of Hessian canvas as a protection against damage from blast wherever other substitutes for glass were unobtainable or too dear.—Mr. W. MABANE, under-secretary to the Home Office, replied: I am having further inquiries made about the experiment.

Examination of Recruits

Dr. IRENE WARD asked the Secretary of State for War who in his department, other than medical men and women, had the right to overrule the medical opinion of civilian doctors employed in examining recruits both for the Army and the Auxiliary Territorial Service without reference to the medical men or women responsible for the original examination or to other qualified medical consultants.—Mr. R. K. LAW, financial secretary to the War Office, replied: The Army Medical Department is the only department which can overrule the medical opinion of the civilian doctors employed in examining recruits for the Army or Auxiliary Territorial Service, and specialist advice is obtained whenever considered necessary.

Damage to Doctors' Equipment

Mr. R. W. SORENSEN asked the Minister of Health whether he was aware of particular hardships experienced, or likely to be experienced, by local medical practitioners losing their surgery, equipment and instruments through air-raids, and in losing patients who, through that loss, had to consult other medical practitioners; and whether he would enable swift replacement to be made and other steps taken to enable those medical practitioners to continue their practice.—Miss F. HORSBRUGH, parliamentary secretary to the Ministry, replied: I fear that a number of medical practitioners, like other persons in professional life, have suffered hardships by reason of air-raids, but I have not heard of any cases where serious difficulties in the way of securing treatment for their patients have arisen, and the Minister is not satisfied that it would be proper to provide any special measures of assistance beyond the arrangements announced by the Prime Minister on Sept. 5 last.

Restrictions on Surgical Accessories

Captain G. S. ELLISTON asked the Chancellor of the Exchequer whether he was aware that purchase tax had to be paid on filament lamps forming an essential part of non-chargeable surgical instruments; and whether the exemption granted to medical and surgical appliances could be extended to the accessories necessary for their working.—Sir KINGSLEY WOOD replied: The tax applies to all electric filament lamps not exceeding 250 watts. I understand that many of the lamps used in connexion with surgical appliances may have other uses and in these circumstances I do not think it would be practicable to provide for the exemption of such accessories.

Mr. ROBERT MORGAN asked the President of the Board of Trade whether he was aware that under the Limitation of Goods Order, the quota of certain surgical goods, such as elastic stockings and belts, had been reduced to 50%; and whether he would investigate the effect of the discouragement of the use of these goods on the health of the public.—Mr. OLIVER LYTTLETON replied: Surgical apparel is included under the order in a class covering a very wide range of clothing. Although the quota for the whole class requires supplies in the current period to be limited to 50% of such supplies in the standard period, there is nothing, subject to this over-all limitation, to prevent supplies of surgical goods being met to the full extent of essential requirements.

". . . In the last great war, the surgeons of that day were very satisfied with their efforts, although their treatment was, as we now see, entirely on the wrong lines. The wounds were dressed daily with gauze which stuck to the raw surfaces, each dressing caused great pain and a rise of temperature and generally no inclination for the next meal. A wild search was made for an antiseptic which would kill germs and not harm human cells; the pus in the wounds was regarded as deleterious and every effort was made to replace it with an antiseptic solution and some even went so far as to stitch many small hosepipes into the wounds and squirt chlorine water through these quite frequently. When a bone was fractured, the fracture was made a secondary consideration and the wound treated to its almost complete neglect.

"The way out of all this morass of loose thinking came from a surgeon from Nebraska, who came over to help us in the last war. His name was Winnett-Orr and probably his name will live longer than the generals who led the armies in the field. In the treatment of suppuration in bones in peace time, he found that too much dressing of the wound was employed. He suggested that the abscess should be well drained by making it like a saucer and packing the saucer with greasy gauze and then enclosing the whole limb in a plaster of Paris case. Strongly resisted must be the temptation to leave a window over the wound so that morbid curiosity could be satisfied and the routine of disturbing dressings reinstituted."—A. DICKSON WRIGHT, F.R.C.S., in a paper read before the Royal Society of Arts, Nov. 27, 1940.

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Obituary

THOMAS SINCLAIR

C.B., M.D., M.CH. R.U.I., F.R.C.S.

THE death of Colonel Thomas Sinclair, emeritus professor of surgery in the Queen's University of Belfast, at the age of 82, terminates a career of outstanding distinction in the profession of medicine. His family was closely connected with the industrial and charitable life of the city; he was unmarried and throughout his professional life his house was shared by his sister. In September ill health led him to resign his seat as representative of the Queen's University in the British Parliament. Entering the Belfast medical school as a student in 1877, he gained honours at every stage, so that when he graduated in 1881 in the Queen's University of Ireland with first place and a gold medal he had laid the foundation for a career of high professional achievement. On the advice of Professor Redfern he went on to study in London, taking the F.R.C.S. in 1885, and afterwards visited Berlin and Vienna. When he returned to Belfast it was to become a member of the surgical staff at the old Royal Hospital in Frederick Street, and the Ulster Hospital for Children and Women. But these appointments proved to be but a stepping stone to the professorship of surgery left vacant by the death of his old teacher, Prof. Alexander Gordon. The vacancy, synchronising as it did with the discoveries of Lister and fresh opportunities to the scientific operator, led to a keen contest and it was startling when the youngest candidate, qualified but five years, and with the standing of an assistant surgeon, carried the election. He proved himself equal to the occasion, though he did not at first escape the sidelong glances of his seniors. Whether in the classroom or in the operating theatre he soon established himself as the ultimate court of appeal in all difficult cases. In later years, as his experience increased, he did not escape the common fault of trying to include too much detail in his systematic and clinical lectures. But in the operating theatre and as a clinician he remained a master throughout his professional life. It was said of him that if he had not been the first surgeon in the school he might have been the first physician. He had manual dexterity delightful to watch, a sound knowledge of anatomy, and a logical mind. He refused to be carried away by popular trends, and was always careful to avoid treatment which might leave the patient the worse rather than the better. There is hardly a society in the University of which he had not held the presidential chair, nor a hospital on the staff of which he had not been a consulting member. Between the year 1886, when he was appointed professor, and the outbreak of the last war, he led a very busy life. His health was always poor and he often suffered from the strain of a long and difficult day in the operating theatre; but he managed to deliver four lectures in systematic surgery every week through the winter and four demonstrations a week in operative surgery in the summer, and to give clinical lectures at hospital. He was also an examiner. This was a time when surgery was growing by leaps and bounds and much reading and study were necessary to keep abreast of it; transport was difficult and time-consuming, and the time he gave to teaching, operating, and private consultations prevented him from contributing much to the literature of surgery. But he left his mark among the large band of surgeons who acknowledged his leadership and owed much to his early instruction and example.

He had little time to spare for recreation, but he rode to hounds on most Saturday mornings in the hunting season, he fished and played some golf. The only attraction which was ever known to lure him away from his morning hospital lecture was skating, at which he was an expert. Here he would meet members of his class, who had similarly defaulted, to the pleasure of all. At the outbreak of the last war he volunteered for active service, and became a colonel in the R.A.M.C.; he served as consulting surgeon with the fourth army in France under Rawlinson, and in Egypt under Allenby. His health stood the prolonged strain of field service marvellously, and he readily adapted himself to the new life, developing qualities of comradeship of which many had thought him incapable. He figured in the now historic controversy which marked the death of Baron von Richthofen, the famous German air ace. Richthofen was brought down behind the British lines, his dead body being found in the cockpit of his machine; there were allegations that he had been shot on the ground after he had been forced to descend, but Sinclair established the fact that he had been killed in action.

At the end of the war Sinclair was made a Companion of the Bath; he returned to Belfast to take up his university appointment again. To some extent the contacts of the war gained for him the reputation which his professional standing deserved, and which every member of his own school recognised. Retirement followed in 1923 when he reached the age of 65, and at the same time he gave up the hospital appointment which he had held for 37 years. But he was not allowed to escape from the work of the university; already a member of the senate, he was elected a pro-chancellor. He also became the member for the university in Parliament. On his retirement his portrait was presented by his friends and former pupils, and now hangs in the great hall of the university.

The name of Sinclair is perpetuated today in Belfast and Ulster by his nephews, Major Maynard Sinclair, member of the Northern Ireland Parliament, Mr. Alan Sinclair, professor of Greek in the university, and Major S. R. Sinclair, serving with the forces, and a member of the staff of the Belfast Ophthalmic Hospital.

JAMES BENEDICT MAGENNIS

M.B. N.U.I.

THE sudden death of Dr. J. B. Magennis has robbed Dublin of one of its busiest physicians. The younger son of Dr. Edward Magennis, he was educated at University College, and qualified in 1914 with the degrees of the National University of Ireland. While still a very young man he was appointed assistant physician to St. Vincent's Hospital, and speedily worked into a large consulting practice. He wrote little but he had a reputation as an interesting and practical teacher. Specially interested in the treatment of pulmonary tuberculosis, he was the first in Ireland to adopt the gold treatment, on which he published some enthusiastic papers. He had a large circle of friends in every class of life, and was unsparing in his attention to his patients, rich and poor. Outside his exacting professional work he had a great variety of interests. In his young days he was a good elocutionist and throughout his life he was an excellent amateur actor. He was a keen follower of horse-racing, and for a time ran a horse of his own with considerable success. One of the kindliest of men to all whom he met, he will be much missed both by his professional colleagues and by the public. He was in his fifty-first year and unmarried.

Colonel WILLIAM LECKIE WEBSTER, who died at Middlesex Hospital on Dec. 1, aged 53, graduated from the University of Edinburgh in 1910 and joined the R.A.M.C. (S.R.) the same year. He was promoted brevet major during the last war. He held the French war cross and medal of La Solidaridad and was twice mentioned in dispatches. He served once more in France from January to May this year, and retired only a few days before his death with the rank of lieutenant-colonel.

The following casualties in the R.A.M.C. are announced:—

Prisoner of war.—Lieut.-Colonel G. T. Hankey, M.R.C.S., L.D.S.; Captain F. B. Lake, M.R.C.S.; Captain W. M. Nichols, M.B. Glasg.; Lieutenant F. W. M. Plant, M.R.C.S.; and Lieutenant H. J. Seddon, M.B. Birm.

Previously reported missing, now reported prisoner of war.—Captain J. Burns, M.B.

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Public Health

Diphtheria Immunisation in Plymouth

IN Plymouth the local authority has provided facilities for free immunisation against diphtheria since 1927 but the response has not been encouraging, an annual average of approximately 1200 children having been immunised. Since September of this year an educational campaign has been waged with a view to inducing parents to have their children protected. The local press were sympathetic and helpful and the assistance of the school teachers was readily given. Meetings of parents were addressed by medical officers but this method of propaganda was hardly worth the trouble. It was found that it was simply preaching to the converted since only the intelligent and careful parents, most of whom had already had their children immunised, who attended the meetings. Another example of propaganda producing little result was the personal canvass of about 350 families by a school nurse which brought approximately 50 children for immunisation—and these families had children attending a school in which diphtheria was prevalent. The most fruitful educational methods were found to be by means of the local newspaper and in the maternity and child-welfare centres. The coöperation of the private practitioners was obtained and free immunisation material is issued to them. About 11,000 children have presented themselves for immunisation this year. Taking account of the children protected in recent years and allowing for defaulters it is estimated that half of the children under 15 years of age have been artificially immunised. This proportion of the child population is said to be not enough to have much epidemiological effect, but it is hoped that in the next few months it will be increased.

Typhoid Vaccination in Cardiff

Three centres have been opened where protection against typhoid is offered free of charge. The city fever hospital serves the population on the western side; a centre at the school clinic at 50, Park Place is accessible to those who live in the middle of the town; a third centre in the eastern part, organised with the help of the M.R.C. emergency laboratory service, will be open on Wednesday (early-closing day) afternoons, the city council providing a health nurse. General practitioners can obtain T.A.B. vaccine free on application to the public-health department. Posters have been prepared to advertise the scheme and to advise how to disinfect water if the supply is disturbed.

From the School Reports

Dr. J. L. Burn's school medical report for *Barnsley* for 1939 contains two appendices, one on the medical inspection of pupils attending the juvenile instruction class, the other a brief comparison of the findings of inspection in 1909 and 1939. In opening the latter, Dr. Burn says that the inclusion of the provisions for school medical inspection in the Education Act of 1907 was alleged to be "last minute and almost accidental." It is true that this great social reform of our century did get on the Statute Book as a subsection in a humdrum Provisions Act mixed up with desks and inkpots; but it was not an accident nor was it rushed. For at least three years the Board of Education had been satisfied that medical inspection was essential, but it was doubtful whether Parliament would pass it as a special act; so it was included in the Act of 1907 by way of a ballon d'essai. Actually it was passed without opposition, though if the members had realised to what it was going to lead, it might not have been passed before the last war. Those who had advocated it had a very shrewd idea of its future development. In comparing the children of today with those of a generation ago Dr. Burn is at a disadvantage in that he never saw the last generation and so has to rely on published figures which are not reliable; he recognises that there are differences in the standards adopted, but he does not know how great they are. According to the figures rickets has fallen from 4·2 to 0·7%; but if Dr. Burn had used his own criteria of diagnosis in 1909 he would have found rickets to be nearer 40 than 4%; and conversely, the inspectors of thirty years ago might be excused if they assert that few inspectors of today ever see rickets at all. Running noses, bubbly chests, palpable glands and nits in the hair were so frequent that few children were free from all of them. In many towns there was hardly a girl whose hair was absolutely free from nits, and then only for brief intervals. Most medical inspectors did not bother to record these things, they had to pass them, for there were more serious matters calling imperatively for such attention as was available. Inspection of children attending the juvenile centre is a new thing in Barnsley. Dr. Burn says there is obvious need for full extension of the school medical services to children between the ages of 14 and 16 years, a period in which physical deterioration can readily take place. All who have studied the question will agree with him and the deterioration, which may be disastrous, is readily prevented.

Dr. J. S. G. Burnett of *Chadderton* urban district gives a table of the heights of Chadderton children in 1939 compared with those of London children in 1938, showing the former to be taller and heavier than Londoners at the age of five, but slower in growth, so that at the onset of puberty they are well behind. The numbers are too small to have significance but if the findings are substantiated it would be worth looking for their explanation. There is considerable difference in the attitude to dental treatment of the various schools. Acceptances range from 65 to 11%; definite refusals from 57 to 20%, and failure to return the forms from 69% to nil. The last—indifference—roughly varies inversely with active refusal and calls for somewhat different propaganda. The best school, with 65% acceptance and 35% refusal obviously requires a different approach from the worst, with 11% acceptance, 20% refusal and 69% indifference.

Infectious Disease in England and Wales

DURING THE WEEK ENDED NOV. 9, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1792; whooping-cough, 1925; diphtheria, 1410; enteric fever, 29; measles (excluding rubella) 13,247; pneumonia (primary or influenzal), 713; puerperal pyrexia, 119; cerebrospinal fever, 137; poliomyelitis, 42; polio-encephalitis, 4; encephalitis lethargica, 4; dysentery, 68; ophthalmia neonatorum, 59. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns, including London, there was no death from smallpox or scarlet fever, 4 (0) from enteric fever, 16 (0) from whooping-cough, 29 (1) from measles, 31 (0) from diphtheria, 29 (3) from diarrhœa and enteritis under 2 years, and 30 (4) from influenza. The figures in parentheses are those for London itself.

Brighton, Halifax, Lincoln and Cardiff each reported 1 death from enteric fever. There were 16 deaths from measles and 4 from diphtheria at Liverpool. Birmingham reported 7 fatal cases of whooping-cough.

The number of stillbirths notified during the week was 199 (corresponding to a rate of 41 per thousand total births), including 21 in London.

The trustees of the late Mrs. Honyman Gillespie have arranged for the publication of a first volume of the Edinburgh Postgraduate Lectures in book form (Edinburgh and London: Oliver and Boyd. 10*s.* 6*d.*). Many of the lectures have been reported in our columns in the Scottish news (see p. 756) and some of our readers will welcome the opportunity to study them at length. The present volume contains lectures delivered during 1938 and 1939, and covers a wide range of medical and surgical topics. The book is beautifully produced and illustrated.

The Medical Research Council of Ireland has made a whole-time grant to Mr. John Breen, Ph.D., a part-time grant to Dr. William Hayes, and a grant-in-aid to Dr. J. D. H. Widdess. The following have had their grants renewed: Mr. R. P. Cooke, M.Sc., Mr. P. J. Boyle, M.Sc., Mr. T. G. Brady, D.Sc., Miss E. M. Mason, Dr. Oliver FitzGerald, Dr. Martin Little, Dr. D. K. O'Donovan, Prof. J. F. Donegan, M.B., and Dr. Ninian Falkiner. Dr. R. A. Q. O'Meara has relinquished his whole-time grant and a grant-in-aid has been awarded to him for one year.

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Medical News

University of Cambridge

The honorary degree of M.A. has been conferred on Mr. F. L. Hopwood, D.Sc., professor of physics in the University of London and vice-dean of St. Bartholomew's Hospital medical college.

The following degrees were also conferred by proxy :—

M.D.—A. B. Carter.
M.B., B.Chir.—L. W. Spratt, I. S. Eve and R. G. D. Forward.

University of Manchester

At recent examinations the following were successful :—

FINAL EXAMINATION FOR M.B., CH.B.

Thomas Brittain, I. C. Campbell, Ian Dickson, Harry Diggles, J. H. Gifford, L. A. Gifford, F. T. Jones, P. W. Kippax, William Mellor, Catherine E. D. Nash, G. K. Spruell, T. A. Taylor, Edith M. Thorp, D. H. M. Titcombe (with second-class honours), and Henry Walmsley.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty with Mr. Roy Young, the president, in the chair, the following were admitted to the fellowship :—

A. D. T. Govan (Birmingham), Luk-Yip Hui (Hong-Kong), C. F. W. Illingworth (Glasgow), and G. M. Wishart (Glasgow).

University of Wales

At recent degree examinations the following were successful :

Surgery.—Mary E. Budding, Doreen M. E. Cranch, D. D. Howell, J. V. Jones, and Anne N. M. Llewhelin.

University of Dublin

At recent examinations at the School of Physic, Trinity College, the following were successful :—

M.A.O.

J. B. Fleming (first-class honours).

FINAL EXAMINATION FOR M.B., B.CH., B.A.O.

Medicine.—Yvonne O. Mallet (second-class honours); Olga Bloom, J. M. Slattery, A. H. H. Guilbride, C. D. MacCarthy, J. I. Stafford, J. R. C. Holmes, I. T. Wolpe, R. M. Halahan, Harry Menter, Simon Smullen, and B. E. R. Solomons.

Surgery.—J. T. Hanna, N. M. Smith, I. T. Wolpe, W. J. Thompson, Edna G. Merrick, E. G. W. Lynch, Bernard Kernoff, N. C. Brown, H. B. C. Houston, Gilbert Tattersall, B. E. R. Solomons, Wilbur Badner, H. T. Hutchinson, Harry Menter, J. G. P. Mullally, and J. C. Watson.

Midwifery.—B. W. Wyllie (first-class honours); W. G. D. Caldwell (second-class honours); E. D. Kerr, M. E. Weiner, Basil Marcus, H. H. Robinson, N. J. Anderson, A. F. Crowley, J. E. Adamson, S. D. Killen, and E. G. W. Lynch.

National University of Ireland

The degree of M.D. has been granted to O. P. N. A. Fitz-Gerald.

Faculty of Radiologists

At recent examinations for the fellowship (radiodiagnosis) Dr. Thomas Lodge and Dr. T. D. Overend were successful.

The section of epidemiology and state medicine of the Royal Society of Medicine will meet at 2.30 P.M. on Dec. 20 to discuss hygiene in air-raid shelters. The opening speaker will be Dr. P. G. Stock.

At the annual meeting of the Royal College of Physicians of Edinburgh held on Dec. 5 Prof. Charles McNeil was elected president. Dr. Alexander Goodall, Dr. R. B. Campbell, Dr. L. H. F. Thatcher, Dr. A. Fergus Hewat, Dr. A. Graham Ritchie and Prof. L. S. P. Davidson were elected to form the council of the college, and Dr. Hewat was nominated vice-president.

The next meeting of the Shaftesbury Military Hospital Medical Society will be held on Tuesday, Dec. 17, at 3 P.M. at the hospital. Prof. Phillip D. Wilson and Dr. Bradford of the American Hospital will speak on the treatment of compound fractures of the leg.

The 78th annual meeting of the Royal Surgical Aid Society was held on Dec. 2. The accounts showed a loss of nearly £7000 during the year and an urgent appeal was made to increase the finances during the present year. Mr. Clifton Kelway, F.R.Hist.S., spoke of the tremendous importance of surgery and the value of surgical appliances if what the surgeons had done for the various sufferers was to develop with the best results. During the year the number of patients relieved was 21,559 and the number of appliances supplied 28,781.

Notes, Comments and Abstracts

THE ORIGIN OF SYPHILIS

WHEN and where syphilis first made its appearance has been the subject of much speculation and much historical research. Some inquirers, arguing from the conviction that a disease of such causation must necessarily be almost as old as the human race, have assumed its existence in ancient times and have lavished time and pains in the search for supporting evidence in the literatures of the world. The opposite school have based their arguments on a surer foundation, relying on the accounts of what was then believed to be a new disease in Europe at the end of the fifteenth and the beginning of the sixteenth century and rejecting the hypothesis that the disease had long been present under other names. Dr. J. R. Whitwell ("Syphilis in Earlier Days." London: H. K. Lewis. Pp. 89. 5*s*.) belongs to the first group, and has collected in a convenient summary a large number of references to diseases which may or may not have been syphilis from writings of doctors, poets and prose-writers in many languages from China to Peru. With all this labour he has not produced any irrefutable evidence for the existence of the disease in Europe before the end of the fifteenth century.

On the other side the school of historical research has a well-supported case. Shortly after the return of Columbus from America at the end of the fifteenth century a disease which was certainly syphilis as we know it spread with epidemic violence through Europe. It was first observed in its medical aspects at the siege of Naples by Charles the Eighth in 1495, and spread from Italy to France, Germany and England and the other European countries with startling rapidity and a destructive virulence which was entirely new to the best medical experience of the times. These men were at least familiar with such diseases as leprosy and erysipelas, under which names the disease which we know now as syphilis is supposed by authors of the "imaginative" school to have lurked disguised for previous centuries; and it is inconceivable that they should, with few exceptions, have been unanimous in their judgment that this visitation was something novel and unheard-of. Yet their descriptions of its ravages and its epidemic violence are so unlike the syphilis of our times that some authorities have felt a difficulty in accepting their accounts of it. The difficulty was to a large extent removed when in the nineteenth century syphilis was introduced into Uganda, where it had before been unknown. In Uganda every symptom recorded by our ancestors of the fifteenth century was reproduced with an exactitude which left no doubt that, introduced into a hitherto uninfected population, syphilis could act as a devastating and rapidly spreading pestilence. It is a legitimate deduction that in the fifteenth century Europe was an uninfected area, and that the new disease behaved then as it behaved later in Uganda. Such a contention is supported by a strong piece of negative evidence—the absence of any syphilitic disease of bone in the thousands of exhumed skeletons of former ages, especially in Egypt and Central America.

WHAT WE OUGHT TO EAT

Prof. V. H. Mottram, whose hard lot it is never to be allowed to take his mind off his food, has revenged himself on society by making a book out of all the things he has wanted to say for years ("Healthy Eating." London: Cassell. Pp. 126. 3*s*.). Most of them, he owns, had to be cut out of more scientific work because they were too personal. He has no illusions left about man and his stomach, and he says so quite rudely on nearly every page. When he comes to diet for the slightly abnormal, for example, he has barely got the chapter-heading down before he shouts: "This does not mean you." He snaps crossly at the food reformer who talks about unnatural foods. "Most foods *are* unnatural foods. Possibly the crab-apple, the wild parsnip, carrot and cabbage (*Brassica maritima*), the wild wheat from Mount Hermon and the hedgerow blackberries and sloes are natural foods." And as far as he is concerned the food reformers can have them. He debunks the mineral-salt and roughage faddists, the

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natural-manure fiends, the crude-sugar enthusiasts, the man with a pet vitamin (including himself: he fancies vitamin C) and those who believe in elaborate cooking, or no cooking at all; and he takes away spinach's reputation. He tells us not what to take out of our diet but what to add to it to make it perfect. The things he wants us to take are milk, butter (or vitaminised margarine), cheese, salads, fat fish (herring, mackerel, salmon, sardine) and fruits, especially oranges, lemons, grapefruit and bananas. Alas, milk is to be cut down, bananas and lemons are disappearing, fat fish are fewer, oranges and grapefruit have their price, salads are scarce and housewives pursue cheese relentlessly but not always with success. We still have some butter and plenty of vitaminised margarine and for the rest we must manage on the same old diet that we have been brought up on. But Professor Mottram gives plenty of hints which still fall outside the scope of food control and the exigencies of war, and he has written a book which would be entertaining even if all his suggestions became impossible of attainment, which is far from being the case just yet.

NURSING IN IRELAND

OUR Irish correspondent writes: Nurses are having a hard time in Ireland. Employment is scanty, and it is not easy for a nurse whose working life is necessarily short to make adequate provision for her old age. The voluntary hospitals give very little employment to trained nurses, for their nursing is carried out by fee-paying probationers with a relatively small staff of trained nurses. During the last few years the use of nursing-homes by the moderately well-to-do has increased and the demand for private nurses to work in the patient's home grows less. Formerly, many nurses trained in Ireland obtained employment in England, just as young medical men did, but the war has stopped this migration. Miss A. M. Smithson, secretary of the Irish Nurses' Organisation, in the *Irish Press* of Oct. 29, complains of the "fantastically high fees" charged to girls seeking training, and also of the conditions of work during training. She also points out that all efforts to get a state-pension scheme for nurses have failed. Since the war many Irish nurses who had trained in England and were working there returned to Ireland, and they have further increased the congestion in the nursing profession in Ireland. Irish nurses have a further handicap which Miss Smithson does not mention. Many of the larger and more important training hospitals belong to religious orders, and in these all the posts of responsibility are held by members of the order, while in many of the hospitals administered by local authorities the higher posts are also held by members of religious orders. The lay nurse thus finds herself shut out from promotion to posts which in other countries might be open to her.

MORPHINE AND ITS SIMILARS

IN an address at the opening of the Edinburgh session of evening meetings of the Pharmaceutical Society, Prof. J. W. Cook, regius professor of chemistry in the University of Glasgow, speaking of some biological applications of synthetic chemistry, said that carefully planned researches such as those of the drug addiction committee of the United States public health service should receive every encouragement. Addiction to cocaine had declined rapidly after the discovery of synthetic substitutes such as procaine; and this had stimulated efforts to solve the problem of addiction to the opium alkaloids. Morphine was by no means the ideal analgesic, not only because it produced addiction, but also because of its emetic action and effect on the respiratory system. The efforts of the American investigators had been concentrated on the pharmacology of a wide range of morphine derivatives and of numerous classes of synthetic compounds having some structural features in common with the morphine molecule. Although studies of compounds in which structural changes had been made in the morphine molecule indicated that all of the derivatives of this alkaloid were more or less liable to produce addiction, a considerable number of the synthetic substances had interesting pharmacological properties. One of these, an isoquinoline-tetrahydrophenanthrene derivative, was a powerful analgesic and produced in the cat a typical morphine-like picture without convulsant or emetic action. Clinical studies with a closely related substance showed that it was not liable to produce addiction. Such systematic work, said Professor Cook, would undoubtedly lead to new and valuable drugs.

JELONET is a petroleum-jelly gauze dressing which has been put on the market by Messrs. T. J. Smith and Nephew (Hull). It does not adhere to or become entangled with granulations and thus ensures easy natural extrusion or removal of packing from deep wounds, while as a dressing for shallow wounds or skin-grafts it has the merit of allowing transpiration.

CORRIGENDA.—In the paper by Dr. Lawrence and Dr. Young in our issue of Dec. 7, the sentence in paragraph 2, line 10, should read: Using fresh frozen ox pituitary glands (cf. Young 1937) we have found it impossible to obtain a clear-cut separation of the fat by filtration at this stage, because in our experience the concentration of the alcoholic extract produces a stable emulsion of the fat in the aqueous phase.

In the paper by Mr. Marks and Dr. Young the footnote to table I (castrated rats) refers only to the top line of section B (crude ox extract).

Diethylstilbœstrol was supplied by Messrs. Boots Ltd. and testosterone by Messrs. Ciba Ltd.

Surgeon Captain William Bradbury, M.B.R.U.I., R.N., has been promoted surgeon rear-admiral from Dec. 2. Surgeon Rear-Admiral Thomas Creaser, R.N., has been placed on the retired list.

Appointments

BOYD-COOPER, B. F., L.D.S.: medical registrar at the Royal Dental Hospital, London.

REID, T. H., M.B. Belf.; examining surgeon under the Factories Act 1937 for Selston, Notts.

TAYLOR, ELLIS, M.B. Lpool, D.P.H.: M.O.H. for Atherton and West Houghton.

BREWS, ALAN, M.D., M.S. Lond., F.R.C.S., F.R.C.O.G., M.R.C.P.: obstetric specialist for Essex.

BELL, P. S., M.B. Lond., M.R.C.P., F.R.C.S.: senior M.O., Northern Rhodesia.

CLARKE, J. H. C., M.B. Glasg.: M.O., Northern Rhodesia.

Births, Marriages and Deaths

BIRTHS

ALEXANDER.—On Dec. 4, at Woking, the wife of Dr. P. C. Alexander—a son.

EDEN.—On Dec. 6, at Oxford, the wife of Mr. Kenneth Eden, M.S.—a son.

FORD.—On Dec. 3, at Eynsham Hall, Oxon, the wife of Dr. Cedric Ford—a daughter.

MORE NISBETT.—On Dec. 4, at Malvern, the wife of Surgeon Lieut.-Commander J. G. More Nisbett, R.N.—a son.

MARRIAGES

HOLLAND—MORTON.—On Nov. 28, at Quetta, R. W. B. Holland, M.B. to Joan Ella Morton.

LEDLIE—KAYE.—On Nov. 30 at Chelsea Old Church, London, Reginald C. B. Ledlie, F.R.C.S., to Elspeth M. Kaye, M.B.

MCCOMBE—JOHNSON.—On Dec. 10, at Llansadwrn, Anglesey, Rowan McCombe, M.B., Captain R.A.M.C., to Madeline Johnson.

THORNTON—MACKENZIE.—On Dec. 7, at Glasgow, Kenneth Roy Thornton, M.B., Lieut. R.A.M.C., to Moira Helen Mackenzie.

DEATHS

DICK.—On Dec. 7, at Oxford, William Barclay Dick, L.R.C.P.I., late of Ealing, aged 75 years.

FARMER.—On Dec. 3, Ernest William White Farmer, M.D. Brux, M.R.C.S., aged 85 years.

GLINN.—On Dec. 4, at Devonport, George Frederick Glinn, M.R.C.S., late of Camden Square, London, aged 75 years.

HOWDEN.—On Dec. 7, at Crieff, Perthshire, Robert Howden, M.B., D.Sc. Durh., LL.D. Edin., emeritus professor of anatomy in the University of Durham, aged 84.

SALEEBY.—On Dec. 9, at Aldbury, near Tring, Caleb Williams Saleeby, M.D. Edin., F.R.S.E., aged 62 years.

STANLEY.—In July, 1940, lost at sea, due to enemy action, Henry Stanley, M.D. Durh.

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ORIGINAL ARTICLES

MASS PSYCHOTHERAPY

By E. N. SNOWDEN, M.B. Lond.
PSYCHOLOGIST TO HOSPITAL FOR NERVOUS DISEASES, MAIDA VALE

THE problem of giving an adequate treatment to every patient attending the psychological outpatient department of a hospital has exercised psychotherapists ever since the public came to realise that help could be obtained for nervous troubles. The patients soon demonstrated to the medical profession that this help was welcome by crowding the departments.

If psychotherapy was to justify itself these patients had to receive more in the special departments than they were accustomed to obtaining from their medical practitioners—more than a few words of reassurance and a sedative mixture. The large numbers who attended found the specialists unprepared. A tradition had grown up that anxiety states and similar illnesses were the result of a disturbance in the intimate life of the individual, and that this could only be met by a series of long and secret interviews. Most of the methods of psychological practice, including psycho-analysis, were founded on this principle, and proved to be too slow and elaborate for dealing with large numbers. It is generally agreed that a partly completed analysis is actually harmful to the patient, so that analytic methods can only be used for selected cases and do not solve the problem presented by a crowded outpatient department.

The practical alternative is the method of explanation and re-education. There is nothing new about it; every medical practitioner uses it many times a day in the ordinary task of reassuring an anxious patient. Its simplicity has, fortunately, saved it from being elaborated into a cult, but there is nothing to prevent it being developed into a rapid and effective psychotherapeutic technique. It depends on the facts that in nearly all cases of anxiety or loss of function the cause of the condition is well known to the patient or can be discovered by a little careful questioning, and that he has not associated the symptoms with the cause. He must be helped to see that the symptoms of anxiety are physiological and physical more often than psychological and mental, and are a normal response to the circumstances in which they arise. In most cases there are secondary anxieties, due to his lack of understanding of the nature of the anxiety symptoms themselves, and these secondary anxieties are removed by the explanations. Once the patient realises that the symptoms need not cause anxiety, and that the originating cause is in the past, the way is prepared for re-education; this is directed towards correcting wrong habits of thinking which have become a part of the patient's life, and which may have persisted for many years. In this re-education the patient takes an active part, using the knowledge which the explanation has given him to help his own reasoning.

The method of psychotherapy thus briefly outlined is the most effective for outpatients, and is the most rapid that can be devised; but, as generally used, it still requires separate interviews with the patients and a constant repetition of the same explanations. The numbers that can be treated are still too few in comparison with the number of patients who attend for treatment. Of forty patients attending a department at one session only very few can be given an individual explanation and fifteen minutes of quiet and careful teaching; the remaining cases must be slurred over. If the numbers are restricted by personal appointments the great demand for treatment soon produces a long waiting-list. The difficulty cannot easily be met by increasing the number of psychotherapists unless the amount of accommodation available can be considerably increased, and at most hospitals this is impossible.

GROUP TREATMENT

Most of the cases attending a psychological department suffer from anxiety neurosis of some kind with secondary anxieties; the cause of the anxiety varies greatly, but the psychological mechanism by which the symptoms are produced is essentially the same in every case. At any one session the same explanation is inevitably given to a number of patients one after another, and it seemed that it might be possible to collect the patients of any one type together and give the explanation to them as a class. It was necessary to find out whether the patients would like it, and whether it would be equally effective as a form of treatment without the close personal association of the private interview. The outbreak of war, and the need to continue the service of the hospital with a depleted staff, made an experiment on these lines necessary if the psychological department was to continue to function, and the scheme was therefore tried out at the Hospital for Nervous Diseases, Maida Vale.

The idea has proved to be successful beyond all expectations. The patients enjoy the "lectures," and an atmosphere of cheerfulness and expectation of cure is evident in the department. The improvement in individual cases has been more rapid.

The method is simple. The first interview with the patient is diagnostic, and must achieve three objects, namely:

1. To decide whether the patient is suited for this method of treatment. (Elderly or deaf people cannot be expected to benefit, and many cases of psychosis are unsuitable, although one case of suicidal depression has been cured.)
2. To discover the cause of the illness, and at what period of the patient's life it originated.
3. To explain to the patient the purpose of the new method of treatment.

A careful history is taken. The psychotherapist can be relieved of much of this work by an assistant. By arranging a special case-form for this history the work is much simplified and anyone accustomed to interviewing can soon learn how to use the form. It is devised to explore the five successive phases of the patient's life: childhood, school life, adolescence, working life, and married life or its equivalent. In addition there is a section in which symptoms can be recorded and another for a description of the beginning of the illness with special reference to the mental and physical health just previous to the onset. Working on this case-note as a basis, the psychotherapist can usually discover the origin of the illness, by putting a few questions to the patient at the first interview.

When large numbers are to be treated the patients can now be divided into types, and a special series of talks devised for each class. In practice it has not been possible to do this, and patients of every type have been treated together, the talks being arranged to cover the whole field of psychological illness with special reference to the anxiety states. This method of treating the different types of cases together has worked very well. The talks to the class are simple and are made as interesting as possible, so that the patients appreciate and enjoy hearing about the new aspects of life that they disclose. They come to realise that psychological illness is a natural process, a consequence of the originating cause, and that if the symptoms can take various forms the basic causes are, in most cases, similar to their own. This appears to give them confidence in the method, because they can listen to explanations of symptoms different from their own without emotion, and so with a better understanding. The course consists of eight lectures, and each patient attends once a week, so that the whole treatment takes eight weeks to complete.

The subject of the talks can be varied in any way that the therapist considers necessary, and if the patients are separated into groups the course can be elaborated to deal with various aspects of the group symptoms; but in the present experiment, where the patients are all treated together, the first three lectures deal with various aspects of the anxiety states, then follow separate talks on depression, experience and phobia, simple mental conflict, physical and mental introspection, and a final talk on the application of the principles put forward. Diagrams, illustrating the talks, are built up on a blackboard to assist the explanation and to help the patients to concentrate. Each lecture takes about 20 minutes to deliver.

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After the talk, the patients are allowed to sit together and discuss the subject treated, while they are interviewed separately. These separate interviews last from three to five minutes—long enough for the physician to glance at the case-sheet, to call attention to any point in the lecture which specially applies to the patient's case, to make any additional note, and to prescribe any appropriate medicine. It is wise to make the length of these short interviews as far as possible the same in every case, so as to avoid discontent among the patients. The numbers in the different classes have varied from time to time during the twelve months of the experiment, and the largest class hitherto treated has been 22, but a class of 40 patients could quite well be dealt with in a three-hour session. By multiplying the number of sessions, a very large number of patients could receive a full course of treatment every two months. The method can readily be taught to any medical man who has had a good general training and who has an aptitude for the work, even if he has not had, previously, an extensive experience of psychological cases. The war has already provoked psychoneurosis in some people who would otherwise have remained healthy. The numbers threaten to be great, and adequate treatment of them will require a larger number of trained psychotherapists than is at present available, and more accommodation for treatment than is likely to be forthcoming. Mass psychotherapy may offer a solution of the problem.

SUMMARY

The psychotherapeutic method of explanation and re-education is the method of choice for outpatients. It can be used for the treatment of large numbers by giving explanatory lectures to a class, and supplementing them in short personal interviews.

Mass psychotherapy of this kind has been tried over a period of twelve months with satisfactory results.

It enables the psychotherapist to treat much larger numbers than by any other means without fatigue, and can be adapted for any type of case.

CONTROL OF AIR-BORNE INFECTION IN AIR-RAID SHELTERS AND ELSEWHERE

By C. H. Andrewes, M.D. Lond., F.R.C.P., F.R.S.

AND A TEAM OF WORKERS AT THE NATIONAL INSTITUTE FOR MEDICAL RESEARCH, LONDON

In the early months of the war the late Sir Patrick Laidlaw initiated, at the National Institute for Medical Research, a programme of work on air-borne infections, and the subject has ever since been under study here by a team of workers. Those responsible for various branches of the work have been Dr. R. B. Bourdillon, Mr. R. K. Callow, D.Phil., Dr. D. G. ff. Edward, Mr. W. J. Elford, Ph.D., Mr. R. E. Glover, F.R.C.V.S., Sir Patrick Laidlaw, F.R.S., Mr. O. M. Lidwell, Ph.D., Miss Dora Lush, M.Sc., Dr. R. J. V. Pulvertaft, Dr. C. Todd, F.R.S., Dr. M. van den Ende and myself; this article is published on behalf of the whole team. Details of results obtained will be published by those concerned as they are completed. Meanwhile there is need for all possible precautions against winter diseases, the normal threat of which is increased by the widespread use of overcrowded and often ill-ventilated air-raid shelters. The need for advice on such precautions to those concerned with practical measures does not permit of delay until experiments have been finished to our own satisfaction, and we are therefore publishing this progress report of some of the work carried out at Hampstead, and of the provisional conclusions reached.

Infection through the air may be conveyed in one of three ways.

(1) Relatively large droplet projectiles from 0·1 to 1 mm. or over in diameter may be sprayed from the mouth and nose to a distance of perhaps 15 ft., but these will reach the ground fairly quickly.

(2) Similarly expelled droplets 0·1 mm. in diameter or less (Wells and Wells 1936) will have become so small through evaporation before they reach the floor that as droplet nuclei, consisting of one or very few bacteria, they can float in the air for many hours, or even days. The viability of organisms in droplet nuclei varies; pneumococci and streptococci are particularly resistant. Wells believes that droplet nuclei are of major importance in carrying air-borne infection.

(3) Organisms reaching the floor, bedclothes and other objects may survive on dust which may be subsequently swept up and re-suspended in the air to become a source of danger later. Tubercle bacilli, hæmolytic streptococci and diphtheria bacilli * are among those which may survive in dust. We do not know enough of the relative importance of these three modes of infection. The wise course is therefore to devise means of coping with all three. However in attempting to evaluate the effectiveness of our methods of attack, many technical difficulties are encountered.

Bacteriological Technique

Enumeration of bacteria in air.—It is of primary importance that we should be able to count and identify the bacteria suspended in air, but the variety of methods in use for this purpose shows that none of them is perfect. Exposing agar plates under standard conditions is the easiest method, but these only catch a small and not necessarily representative proportion of suspended organisms. The air-centrifuge designed by Wells aims at depositing the bacteria from large measured volumes of air on the agar which lines rotating cylinders; the colonies growing thereon can be counted. A simpler apparatus devised by Hollaender and Dalla Valle (1939) draws measured volumes of air through a funnel and lets it play on agar plates; many more organisms can thus be caught than by ordinary plate-exposure methods. None of these methods will trap every air-borne bacterium but this may not matter much if the main interest is in the relative numbers of organisms present under different conditions. Analysis shows, however, that the bacteria caught by all these methods are largely sporing aerobic bacilli and cocci from skin, dust and clothes. Such organisms are of far less interest as potential pathogens than the denizens of the respiratory tract. The abundant dust-borne bacilli and cocci are in practice hard to kill by some of the available methods of control, so that air-samples obtained before and after treatment with ultraviolet light or disinfectant mists, for example, may show no appreciable fall in the bacterial population. The value of such methods in eliminating pathogenic organisms might therefore be unjustifiably discredited. Where a readily identifiable pathogen such as *Streptococcus hæmolyticus* is concerned (cf. Cruickshank and Muir 1940) encouraging results have not been so difficult to obtain. Gordon (1902–03) Wells and others (1939) and Buchbinder and others (1938) have urged that *Strep. viridans* should be sought for and used as an index of respiratory air-pollution just as *Bacillus coli* is used in water-hygiene, but our studies have not yet produced a quick and practicable method of estimating its presence quantitatively. The use of blood-agar containing 1 : 500,000 gentian violet may prove of value in suppressing many unwanted "tin cans and kettles," such as air cocci, while permitting streptococci to grow (Garrod 1933).

Methods of testing counter-measures.—During the work at Hampstead we have proceeded from tests in small glass desiccators and aspirator jars to tests in specially designed metal tanks, in small rooms and finally in the field. Bacteria and viruses in various media have been suspended in the air in fine sprays; tests have been made of their normal persistence and their resistance to ultraviolet light, antiseptic mists and other measures. As will be shown later, bacteria thus suspended as droplet nuclei are relatively vulnerable to counter-measures and particularly so when sprayed in aqueous suspension free from other organic matter, whereas organisms on dust are far harder to kill. A fortunate chance has permitted us to make tests on organisms reaching the air naturally from the respiratory tract. A ferret infected with influenza virus accidentally became infected with a hæmolytic streptococcus (group C Lancefield). This streptococcus would not infect normal ferrets when

* Personal communication about the diphtheria bacilli from Prof. H. D. Wright.

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inoculated intranasally but readily established itself in the noses of ferrets infected with influenza. On blood-agar plates exposed in a cubicle containing such a doubly infected ferret numerous colonies of hæmolytic streptococci appeared with regularity and a remarkable opportunity was thus available for studying the effects of control measures on organisms actually scattered from the respiratory tract of an infected animal. No certainty exists as to whether the streptococci reached the plates directly as a result of sneezes or after drying and redistribution into the air.

Methods of Control

No method for the control of infection is as effective as adequate spacing of individuals combined with adequate ventilation. These enormously reduce the risk of infection whether from droplets, droplet nuclei or dust. The methods now to be described are of value only as second-rate substitutes where proper spacing and ventilation cannot be achieved.

ORGANISMS IN COARSE DROPLETS

One can hardly expect to be able to control bacteria contained in coarse droplets spat, coughed or sneezed directly from one person to another except by mechanical means. The most efficient of these is doubtless the isolation of the infected person or the dissuasion of potentially infectious persons from working or sheltering in close contact with others. Where the nature of the sleeping quarters permits, a sheet of plaster-board or other material placed between the heads of adjacent sleepers would be expected to stop the passage of coarse droplets.

Masks.—Where mixing of normal and infected persons is inevitable masks may prove of great value. The double layer of coarse gauze used by some surgeons has been shown to be relatively inefficient in stopping droplets. Four layers of finer gauze (mesh at least 48 to the inch) will stop coarse droplets when worn for several hours by a normal person; whether this would be effective against the droplets emitted during a succession of sneezes is more doubtful. A layer of Cellophane between two layers of gauze is a much better barrier, but, even more than other masks of this type, may prove unacceptable to those introduced to it for the first time. It may be easier to induce people, particularly women, to wear something like a "yashmak" with some impermeable material incorporated in it immediately in front of the nose and mouth.

A simple, easily tolerated, transparent mask may be made of cellulose-acetate sheet (9 in. × 5 in. × 5/1000 in.; a smaller pattern measures 5¼ in. × 5 in. × 5/1000 in.). The top edge is bound with adhesive tape and held across the nose either by elastic or by glazite-coated copper or brass wire loops. Loops over the ears hold the mask on the face and by extending or compressing a V-shaped section of wire in front of each ear a single size of mask can be adapted to widely differing faces. A mask like this could probably be mass-produced at a cost between 1*d.* and 2*d.* Such a mask will effectively stop directly projected droplets, except when projected downwards, as has been shown by experiments in which people with and without masks rinse out their mouths with cultures of *B. prodigiosus* and then talk in front of exposed agar plates.

Transparent cellulose-acetate masks, being carried well away from the face, are free from the criticism that they may cause congestion of the mucous membranes and hinder a healthy to-and-fro passage of air. They can be comfortably worn by people with colds, while gauze masks cannot; moisture may, however, be found to condense on them in the very humid atmosphere of some air-raid shelters.

The various types of masks are effective, to different degrees, in stopping the dispersal of organisms by an infected person. How far will their use protect a normal person from infection? Probably fairly well so far as coarse droplets are the source of danger, the truly impermeable masks (cellophane in gauze and cellulose acetate) being the more efficient. It is desirable in designing masks of any type to ensure that the wearer cannot wear them one way round on one occasion and inside-out on the next, without intervening sterilisation. Preliminary tests suggest that none of the masks discussed here can be relied on to prevent the inhalation of organisms in the form of droplet nuclei. Persons breathing a dilute artificial mist of *B. prodigiosus* for 10 minutes were not prevented by any type of mask from yielding a growth of the organisms when nasal swabs were taken at the end of the period.

It is probably unnecessary and certainly futile to try to persuade all occupants of air-raid shelters and others in crowded places to wear masks now. But it should not be impossible to induce workers and "shelterers" to wear them for three or four days at the onset of a severe cold; or to get them generally used in all public places in the presence of a severe influenza epidemic. Masks could not, of course, be worn during eating. Gauze, but not cellulose-acetate, masks can be worn during sleep. Many fewer organisms are distributed into the air during sleep than in waking hours; there would probably be little object, therefore, in encouraging sleeping in masks unless for people with coughs.

Serious attempts at persuasion or compulsion would have to be preceded by a propaganda campaign in which the means of transference of respiratory infections would be simply explained. It would be possible to provide instantaneous photographs of sneezes with the droplets displayed by strong illumination (such as have lately been published in America) to illustrate the protective effects of masks.

ORGANISMS IN DROPLET NUCLEI

Ultraviolet light.—There have been enthusiastic reports of the value of ultraviolet light, particularly from America. Our own experiments on a laboratory scale confirmed its remarkable bactericidal action. A germicidal ultraviolet lamp, consisting of two 12 in. quartz tubes suspended in a bowl, was placed in a room of 800 cu. ft. capacity, so that light shone upwards and irradiated the space between it and the ceiling but was screened by the bowl from the direct vision of people in the room—a necessary precaution against eye-injury. A mist of *Strept. salivarius* or staphylococci suspended in broth was sprayed into the room and was made to circulate round the room by an electric fan as well as by convection currents from a hot-water radiator. As the bacteria passed in course of time in front of the lamp they were exposed to its bactericidal rays. Plates exposed in the room without the lamp showed that the organisms recoverable during five minute exposures fell from about 23,000 to 17,000 in twenty minutes. When the lamp was switched on the corresponding drop was from 23,000 to 115. This rate of fall would be achieved by a ventilation turn-over of thirty changes per hour. Even more striking results were obtained when bacteria were sprayed into the room continuously. Instead of a banking-up effect, a fall from 18,000 to 730 organisms per plate occurred in ten minutes. Extensive experiments under rather different conditions with other types of lamp also gave encouraging results.

Trials under practical conditions, in hospital wards and elsewhere, did not confirm our optimistic impressions. In the best set of circumstances the number of organisms was reduced to half or a quarter by the lamps but in many tests no fall at all was recorded. Many factors militated against the success of the trials, one in particular being of major importance; the bacteria recovered on plates and in the Wells centrifuge were mainly dust organisms—cocci and sporing bacilli. A return to laboratory tests showed us that these bacteria on dust are extremely resistant to the action of ultraviolet light. Thus, though we could obtain but poor evidence of a beneficial effect from ultraviolet light, it is possible that pathogens from the respiratory tract were being killed but that the fact eluded our observation, owing to the vast numbers of other organisms obscuring them. In a few experiments with the streptococcus-emitting ferret already mentioned, an ultraviolet lamp produced a drop in the numbers of streptococci falling on to exposed plates; for technical reasons this line of work has not been pursued further.

Ultraviolet rays are very effective against bacteria in fine particles and less so on those on dust, whereas cloth and other filters have a complementary activity, being capable of removing the coarse but not the fine particles. It is therefore possible to make a duct containing lamps

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and to pass air by means of a fan first through a dust-retaining cloth filter and then over the lamps. Air almost or wholly free from bacteria can thus be obtained at the exit from the duct. Such a system has been used in a number of trials in operating-theatres; it can be slung out of the way above the surgeon's head and used to direct an almost imperceptible current of clean air on the operation site. A system of lamps in ducts may also be profitably installed in certain places where forced ventilation is already in use, but it is not practicable for immediate adoption in large numbers of shelters, mainly because of the cost of installing and maintaining the apparatus.

BACTERICIDAL MISTS

Bacteria can be killed in the air by means of persistent mists of very fine particles produced by nebulising certain antiseptic solutions with atomisers of special design. Trillat (1938), who introduced them, called such mists "aerosols" but this term has been used in several different senses and will be avoided in this discussion. Although the mechanism of their action is not yet clear, their efficacy probably depends on collision between antiseptic particles and infective droplet nuclei. Much doubt exists as to the factors which determine whether a particular substance shall have bactericidal action when in mist form; there seems to be little relation between such activity and the Rideal-Walker coefficient. It may be said at once that many proprietary substances advocated for use as mists are valueless for the purpose of direct aerial disinfection, and further that devices are often used to put up such mists in public places which fail to produce a mist sufficiently fine to be of any value.

Bacteria vary in their susceptibility to antiseptic mists. Bacterial spores are hardest to kill, and of pathogenic organisms streptococci and staphylococci are more resistant than most gram-negative bacilli. A hæmolytic streptococcus of group C has been used in many of our studies because of its high resistance. A few viruses, including that of influenza, have been found susceptible as judged by the reduction of their infectivity for mice. Bacteria dried or on dust are probably harder to kill than when atomised in a moist form. Tests on the hæmolytic streptococci emitted by infected ferrets show that organisms gaining access to the air from an animal's respiratory tract may be killed by antiseptic mists. As in other examples of antiseptic action, organic material present in the fluid medium containing the organism increases the latter's resistance. Under practical conditions hæmolytic streptococci in the air of wards have apparently been killed by antiseptic mists (Cruickshank and Muir 1940). An effect on other human pathogens has been hard to prove because of the previously mentioned difficulty of identifying and enumerating these in the presence of vast numbers of dust organisms.

Among the few substances which have proved to be of value as antiseptic mists may be mentioned sodium hypochlorite, chloramine-T, resorcinol, hexyl-resorcinol, eugenol carbinol and catechol. The last four of these are most effective when dissolved in propylene glycol, hexyl-resorcinol in propylene glycol possessing especial potency (Twort et al 1940). Antiseptic mists differ in cost, smell, toxicity, as irritants to mucous surfaces in speed of bactericidal action and in effective life (the time during which the mist retains its bactericidal efficiency). For various reasons several of the antiseptics mentioned, including chloramine-T and catechol, may be eliminated. A few good ones remain.

Hexyl-resorcinol in propylene glycol has proved perhaps the most effective under laboratory conditions, but unfortunately neither the antiseptic nor its solvent is at present readily enough available in large amounts to warrant its introduction except for special purposes.

Eugenol carbinol in propylene glycol or in 7·5% glycerol is also effective. It could be made in quantity if necessary since it is a derivative of clove oil; it makes an almost odourless non-irritating mist and so far as our tests have proceeded seems to be non-toxic. Work on the properties of the mist has, however, not yet proceeded far enough to warrant our advocating its widespread use.

Resorcinol in glycerol is effective but must be used in higher concentrations than other substances discussed.

Sodium hypochlorite is agreed to possess many advantages though the mechanism of its action, whether as mist or as hypochlorous acid gas, is in dispute. It is very cheap and is procurable either by electrolysis of sea-water or by chemical means in unlimited amount. Alone among the substances mentioned it is a valuable dedorant, a fact which by itself might make its use desirable under certain conditions, as in ill-ventilated shelters. It has been used in medicine and surgery for so long that one need have no qualms as to possible toxicity in the concentrations used. It is effective in low concentration; 5 c.cm. of a 0·5 or 1% solution sprayed into the air will rapidly kill 95% of streptococci suspended in the air of a room of about 1000 cu. ft. capacity. Preliminary tests indicate that, in the concentrations necessary, damage through bleaching of various fabrics does not readily occur. This matter will have to be watched during more extensive trials; so also will the danger of discoloration or corrosion of metals, which are likely to be affected as they are by sea-water. For this reason it is unwise, as Baker and others (1940) point out, to allow the concentration of sodium chloride in the solution to be too high. Hypochlorite sprays should not be used in the presence of certain electrical equipment such as telephone switchboards.

HOW AND WHEN TO SPRAY

Spraying instruments.—For putting up hypochlorite mists it is necessary to use machines not made of metal; most of those available being of metal will not withstand long use with hypochlorite solutions. Small hand-operated sprayers have a limited applicability—only, in fact, to small rooms or shelters. Larger spaces can be dealt with by foot-operated machines, but for those of over 2000 cu. ft. capacity electrically driven compressors are best unless volunteers for pumping are freely available. Such an electrically operated instrument which can be used with hypochlorite is marketed under the name of Dynalysor. A simpler type of sprayer has been devised at this institute; this can be worked with foot or electrical pumps such as are used for inflating motor tyres. It consists of a nozzle on the ordinary scent-spray principle; the force of a jet of compressed air sucks up fluid from a reservoir and throws out a mixture of coarse and fine droplets. The sprayer is inside a box; a screen above it retains the coarser droplets, allowing only a fine mist to emerge at the top. Two sizes of machine have an output of 1 c.cm. and 4 c.cm. per minute, and are suitable for use, one with a foot pump, the other with an electrical compressor or other supply of compressed air. The machines have been made of ebonite, but other materials may prove to be better. It is desirable to place spraying machines in a natural draught or near a fan to distribute the mist evenly. For spraying solutions containing propylene glycol another type of machine has been devised, capable of nebulising more viscid liquids.

Amount of sprayed solution required.—As already mentioned, a mist made from 5 c.cm. of 0·5 or 1% hypochlorite will kill most of the organisms in 1000 cu. ft. of air (1 part of hypochlorous gas in 1–2 million parts of air). This quantity would have to be nebulised every thirty minutes even where there was no good ventilation in order to keep up an effective concentration. If loss through ventilation were excessive it might be necessary to nebulise continuously. The smell of hypochlorite will usually be just perceptible to those entering a room, but would probably be imperceptible after a short time. A mist causing irritation to conjunctiva or respiratory tract should be regarded as excessive.

Sprays in shelters.—The proper application of sprays to shelters presents problems peculiar to each shelter, depending on their size, configuration and ventilation. Sprays of the type under discussion are designed to kill organisms as they are dispersed into the air from the respiratory tract; they are not the best method of cleaning the air of shelters in the absence of their human populations (apart from the deodorising value of hypochlorites). Antiseptic mists are probably best nebulised in shelters for a short time before they are to be occupied, and the mists should be maintained by repeated spraying from time to time until the inhabitants settle down for the night and again when there is activity in the morning. When there is an epidemic with much coughing or sneezing all-night nebulisation might be necessary.

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ORGANISMS ON DUST

The persistence of some organisms in dust (tubercle bacilli, hæmolytic streptococci, diphtheria bacilli) is now well recognised as a source of danger. Certain special cleaning methods mark an advance on those generally in use even including wet sweeping and dusting.

Treatment of floors.—A recent paper by van den Ende, Lush and Edward (1940) from this institute describes how hæmolytic streptococci from an experimentally contaminated blanket may reach the floor and be re-suspended in the air of a room by sweeping. When such an infected blanket was beaten and colony-counts made on plates exposed for ten minutes 5 ft. from the ground a count of 312 was obtained in one experiment. When the dust had been allowed to settle and the room ventilated, the count was down to 2 for a similar period, but during and after sweeping it rose again to 99. In a similar room the floor had been treated with a proprietary dust-layer (Florigene), and the corresponding counts were: after the blanket beating, 435; after ventilation of the room, 2; during and after sweeping, 0. Most of the infective particles thus wholly failed to rise from the treated floor. Similar results were obtained in other tests. Instead of florigene, crude liquid parafin (spindle oil) could be used with equally good effect; this is readily available in large quantities at a low price. These dust-layers act mechanically by making the dust partieles sticky and mutually adherent; instead of being fluffy the dust is matted and is readily swept away without being dispersed into the air. Organisms are not killed by the oil and most antiseptics have in fact no bactericidal action in such an oily medium. Wood, linoleum and cement floors treated with a small quantity of the oil may be slightly slippery for twenty-four hours; after this the surface looks dull but, after a first treatment, remains effective for between three and six weeks, and after subsequent treatments even longer. The oil cannot be used on rubber floors, and highly polished floors may have to have some of the polish removed before the oil will "take" well. The use of spindle-oil has perhaps its greatest application in hospital wards, but danger from dust might be greatly reduced by its use in shelters, factories, offices and other places. As a control measure it is noteworthy for its cheapness and ease of application.

Treatment of bedclothes.—It has long been known that the number of bacteria in the air of hospital wards varies with the state of activity of the occupants and at bed-making times the bacterial counts rise to a peak, owing to the distribution of large numbers of bacteria on minute fragments of textile fabrics which are buoyant and remain in suspension for a long time. In order to reduce the numbers of bacteria distributed from bedclothes two methods are available. The bedclothes can be treated either with suitable antiseptics or with substances designed to reduce the amount of dust liberated. Our laboratory trials have not yet revealed a practicable method of dealing with the problem by treatment of bedclothes with antiseptics, but of the methods designed to reduce the amount of dust one has given sufficiently encouraging experimental results to warrant its trial under working conditions—the application of very small amounts of liquid paraffin as a solution of the oil in white spirit (a petroleum product used in dry cleaning).

Woollen blankets soaked in a 30% solution and then freed from excess by centrifugation in a hydro-extractor retain approximately 3% of their weight of oil, but are nevertheless not perceptibly oily to the touch; they are in fact almost indistinguishable from untreated blankets. The shaking or beating of "oiled" blankets results in the liberation of only a small amount of dust and this consists entirely of large fibre fragments which settle rapidly to the floor. Control blankets similarly beaten liberate much more dust, consisting of minute fragments of fibre or wool scales which remain suspended in the air for a long period. Counts on blood-agar plates exposed in rooms in which naturally or artificially infected blankets were shaken showed corresponding differences. This reduction in the bacterial counts was observed if the blankets were artificially infected with a coarse spray of hæmolytic streptococci or *Staphylococcus albus* in serum broth, or with a mixture of dry streptococcus powder and fine carpet dust.

The dust-laying power of the oil varies on different textiles. In a typical experiment with coarse blankets, plates exposed for five minutes during and after beating showed 170 colonies in the case of the oiled blanket and 1030 with the control. For a second five-minute after-period the plate counts were 9 and 280 respectively. The results were even more striking in experiments with pure woollen materials such as serge and "all-wool" blankets. With the latter a reduction of as much as 95% has been obtained. On the other hand, with cotton sheets the reduction of dust and bacterial counts, though significant, was less striking; this is probably at least partly due to the fact that the amount of dust normally liberated from sheets is less than that which is obtained from woollen blankets. Besides being highly effective, liquid-paraffin treatment has the advantage of being inexpensive and of requiring no more elaborate apparatus than that in every day use by dry cleaners or launderers.

Conclusion

We have discussed certain methods for the control of respiratory disease; none of these is of proved efficacy in the field, though all of them have given encouraging results in the laboratory. What justification is there for urging the use of methods of such unproven value? Only this: that our means of controlling respiratory disease in the past have certainly been inadequate. The unprecedented conditions of life in a large part of Britain during this winter may be expected to swing the odds in the struggle between man and his respiratory pathogens still more heavily in favour of the bacterial forces. An ordered plan of defence is more necessary than ever before. Our weapons of defence include the improvement of ventilation, masks, ultraviolet light, antiseptic mists, paraffining of floors and blankets. Which of these is best employed in any set of conditions is a tactical problem for the medical man in charge. In many instances it will be advisable and even necessary to combat simultaneously the three dangers of droplets, droplet nuclei and dust.

Summary

Air-borne infection may be conveyed (1) in large droplet projectiles sprayed short distances from the mouth or nose; (2) in droplet nuclei which may float in the air for long periods; and (3) on dust.

Adequate spacing and ventilation are the most important counter-measures whatever the route of spread. Small- and large-scale investigations have been made into the efficacy of other measures which may be applied when these are impracticable.

Spread by large droplets may be controlled (1) by isolation of infected persons; (2) by screens between the heads of neighbouring sleepers; and (3) by masks, of which one made of transparent cellulose acetate is comfortable, effective and cheap, though unsuitable for wearing at night. Masks should be worn during the daytime by workpeople and occupants of shelters who have colds and by all occupants of public places during influenza epidemics. In shelters those with coughs should wear a gauze mask at night.

Ultraviolet light is highly effective against organisms in droplet nuclei but much less so against organisms on dust. Where forced ventilation is in use the issuing air can be rendered almost sterile by passing it through a cloth filter and between ultraviolet lamps. The cost of installation renders the general use of ultraviolet light impracticable in shelters at the moment.

Of several bactericidal mists effective against suspended organisms a mist of sodium hypochlorite is cheap, harmless in low concentrations, almost odourless and a powerful deodorant. Sodium hypochlorite corrodes metal, but suitable non-metallic sprayers are available, worked either electrically or by a foot-pump. Small shelters should be sprayed before the occupants assemble, every half hour before they settle down for the night, and again in the morning. In an epidemic spraying may have to be repeated every half-hour during the night. It may be necessary to spray large shelters more or less continuously.

Dust on floors can be prevented from rising by treating the surface once a month with spindle oil (crude liquid paraffin). Blankets can be prevented from dispersing their dust by soaking them in a 30% solution

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of liquid paraffin in white spirit, and this will not make them feel oily.

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EFFECTS OF SERUM AND SALINE INFUSIONS

QUANTITATIVE STUDIES IN MAN

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With technical assistance of A. C. PINCOCK
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ACCURATE knowledge is needed of the effects of various types of infusions recommended in the treatment of hæmorrhage and shock, both of which conditions are characterised by a depletion of the volume of circulating blood. Although the basic phenomena of shock were reasonably well understood in the last war, the quantitative aspects of treatment have not yet been adequately studied.

MATERIAL AND METHODS

Observations have been made on healthy adult males as well as in cases of circulatory collapse. For the latter studies the best material was found to be patients who had undergone operation, with or without extensive loss of blood. Two cases of uncomplicated traumatic shock have been studied. Blood-volume was determined in the normal people by a modified carbon-monoxide method, and in the shocked patients by a new method, which will be described in a separate paper. It was found that a close inverse relationship existed between blood-volume and hæmoglobin, as suggested by Robertson (1935). While rapid changes of blood-volume are taking place after hæmorrhage has ceased or after infusions of serum or saline, the corpuscular content of the circulating blood remains constant—i.e., these rapid changes of blood-volume are due to alterations in the amount of plasma. Hæmoglobin was estimated at first by the Haldane method, and in later experiments by a photoelectric method. A Haldane hæmoglobinometer generally gives sufficient accuracy for detection of the degree of change usually observed. Blood-pressure and pulse-rate were also recorded. The solutions injected were: (1) normal saline; (2) four-times normal saline; (3) four-times concentrated reconstituted dried serum; (4) serum-saline (Clegg and Dible 1940) and; (5) plasma.

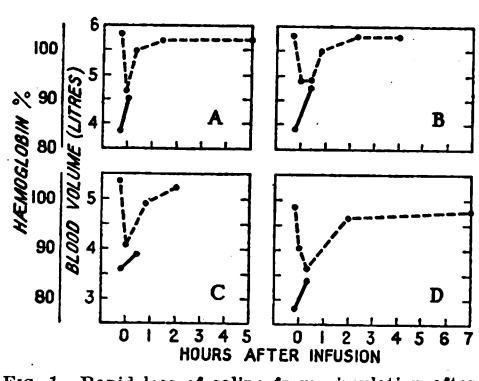

FIG. 1—Rapid loss of saline from circulation after intravenous infusion in normal people: A, B, C, 1000 c.cm. of normal saline; D, 200 c.cm. of a 3·6% solution of sodium chloride (four-times normal); circles, hæmoglobin; squares, blood-volume; zero hour marks the end of the infusion.

INFUSIONS IN NORMAL ADULTS

The changes in blood-volume after infusion were followed by hæmoglobin estimations and in some cases directly.

Doses of 1000 c.cm. of normal saline or smaller quantities of a 3·6% saline solution have been given intravenously to 6 normal people. The further dilution of circulating blood due to hypertonic infusions takes place so rapidly that the effect is essentially similar to that resulting from the infusion of an equivalent quantity of normal saline. Fig. 1 † shows that saline is lost very rapidly from the circulation. Even when the blood-volume is measured as soon as possible after the infusion the increase is considerably less than the volume of fluid added to the circulation.

Doses of 200 c.cm. of four-times concentrated serum (prepared from dried serum) were given to 3 normal people (fig. 2 A, B, C). The dilution of the blood, equivalent in each case to an increase in blood-volume about four times as great as the volume of serum injected, is seen to be maintained for long periods, in 2 cases for days. The third case was not followed for more than seven hours.

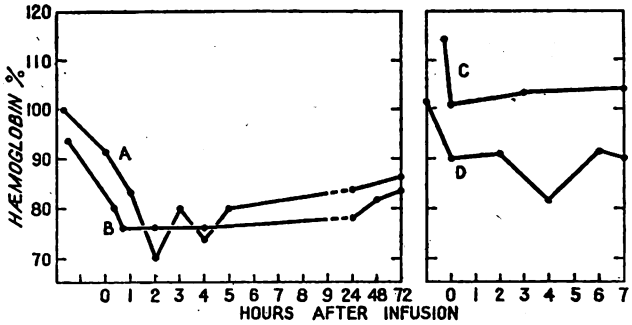

FIG. 2—Concentration of hæmoglobin after intravenous infusion in normal people: A, B, C, 200 c.cm. of concentrated (four-times normal) serum; D, 1000 c.cm. of normal serum; zero hour marks the end of the infusion.

The effect of infusion of 1000 c.cm. of serum saline into a normal person is shown in fig. 2 D. The blood-volume was not measured; but a value of 5 litres being assumed, the dilution of the blood at 6 hours suggests that about half of the litre infused remained in circulation. In the treatment of shocked patients it has been our experience that the initial dilution of the blood after the transfusion of serum-saline is followed rapidly by reconcentration corresponding to a loss of about 40–50% of the added fluid. The protein content of the serum-saline is about 60% of that in normal plasma (the low value is due to dilution with saline citrate), and it seems that infusion is followed rapidly by the loss from the circulation of sufficient non-protein fluid to restore the colloid-osmotic pressure to its original value. The infusion of quantities of fluid as great as 1000 c.cm. into normal people is not attended by any rise in blood-pressure, even though the added fluid is retained in circulation.

The cases described in this paper are only a selection of those in which concentrated serum and serum-saline have been given. Besides the examples recorded, four-times concentrated serum has been given in doses of 50–300 c.cm. to 23 people, 9 of whom were of an incompatible blood-group, and 1000 c.cm. of serum-saline was given to 6 people. No serious reactions took place.

INFUSIONS IN CIRCULATORY COLLAPSE

CASE 1.—Man, aged 56, partial gastrectomy and resection of adjacent viscera for carcinoma. This patient was given

* Working for the Medical Research Council.

† The time scale in most of the charts had to be compressed after the first few hours, in order to show the rapid changes in the early stages and the slower adjustments later. This has been done in an arbitrary fashion to illustrate as well as possible the essential data. "Serum" in the charts refers to serum-saline.

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saline only. The pulse-rate continued to rise for 20 hours, and the systolic and pulse pressures, after improving slightly during the period of intravenous saline drip, fell. Subsequently spontaneous improvement took place accompanied by dilution of the blood (see fig. 3).

This case brings out the transient effects of saline infusion. Until blood-volume is restored by maintained dilution of the blood, recovery does not take place.

CASE 2.—Woman, aged 48. Radical mastectomy with considerable hæmorrhage. Intravenous saline raised blood-pressure and slowed the heart only temporarily. Blood and serum raised blood-pressure and slowed the heart, and these changes were maintained (see fig. 4).

This case emphasises the fleeting improvement produced by saline and brings out by contrast the maintained effects of blood and serum transfusions.

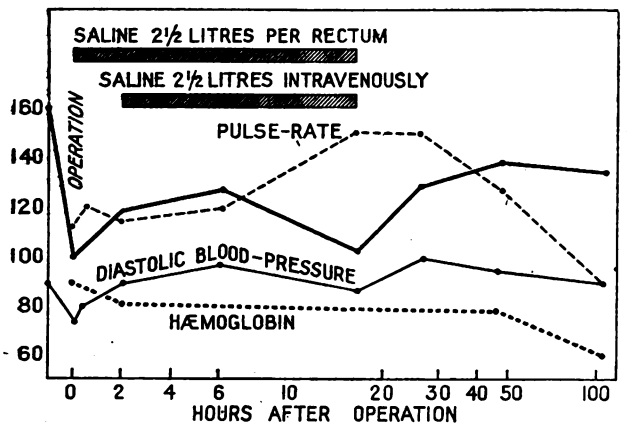

FIG. 3—Effects of infusion of saline after partial gastrectomy and resection of adjacent viscera for carcinoma (case 1). Upper continuous line = Systolic B.P.

CASE 3.—Woman, aged 36. Attempted nephrectomy accompanied by great loss of blood. Intravenous infusion of 1600 c.cm. of serum-saline raised the blood-pressure by 60 mm. Hg. The blood-pressure was maintained, as was the dilution of the blood (see fig. 5).

CASE 4.—Man, aged 58. Internal hernia with blood-stained peritoneal exudate. Resection of 9 ft. of ileum. Postoperative circulatory collapse, with maintained benefit after a litre of plasma (fig. 6). Further progress uninterrupted.

Cases 3 and 4 further illustrate the maintained improvement resulting from the transfusion of serum.

CASE 5.—Woman, aged 44. Radical mastectomy. The loss of blood at operation was 1640 c.cm. (estimated by soaking out swabs). The initial dose of serum raised the blood-pressure, but the pulse-rate began to mount. Seven hours after operation the patient collapsed, with an imperceptible pulse. Intravenous saline had an inadequate effect, and it was not until 1000 c.cm. of serum was given that the blood-pressure seemed to be satisfactorily restored. The improvement was not maintained, and the patient died some hours later (fig. 7). Necropsy showed dry exsanguinated viscera, and death was due to the circulatory collapse resulting from hæmorrhage.

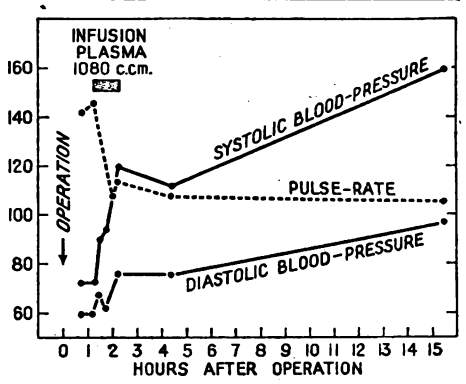

FIG. 6—Effects of infusion of plasma after operation for internal hernia with bloodstained peritoneal exudate (case 4).

Case 5 is especially important, because the patient might have been saved by more adequate treatment. The patient's blood belonged to group II, and this was the first patient to whom we transfused serum from the theoretically incompatible group IV. For this reason we hesitated to give more than one bottle until we had watched for possible ill effects. During this period of watching circulatory collapse took place, and the patient died in spite of a temporary rise in blood-pressure produced by a litre of serum. Necropsy showed no evidence of intravascular hæmolysis or other deleterious effects of incompatibility, and, from this fact and our experience with other subjects we are satisfied that incompatible serum can be used safely in large quantities. Other points that arise from this case are (1) that partial restoration of the blood-pressure is useless; transfusion must be continued until the blood-pressure is at least 100 mm. Hg and preferably higher; and (2) that the late restoration of blood-pressure to a normal level may not be maintained.

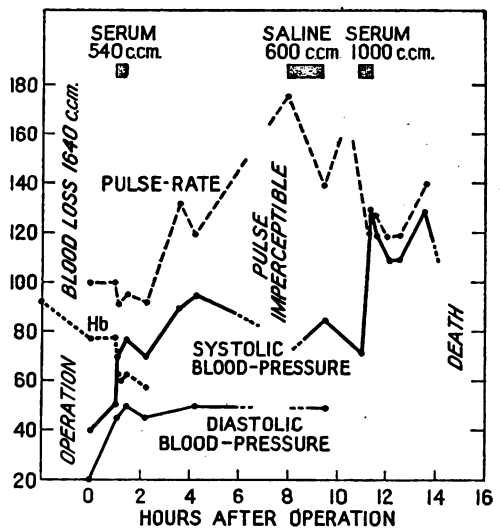

FIG. 7—Effects of infusions of saline and serum after radical mastectomy accompanied by a loss of 1640 c.cm. of blood (case 5).

CASE 6.—Man, aged 50. Difficult gastrectomy for penetrating ulcer. This patient was given a litre of serum which appeared to be retained for a few hours. Later, however, the systolic and pulse pressures fell, the pulse-rate rose, and there was concentration of the blood. An infusion of 540 c.cm. of blood produced benefit, which was maintained (fig. 8).

The partial recovery from circulatory collapse after the infusion of a litre of serum was not maintained for more than about three hours, and a further infusion was required later.

CASE 7.—Boy, aged 12. Kidney ruptured by lorry wheel three hours before infusion was begun. Initial shock profound. The improvement due to the first transfusions of blood and serum was not maintained, and shock again increased parallel with concentration of the blood. Two

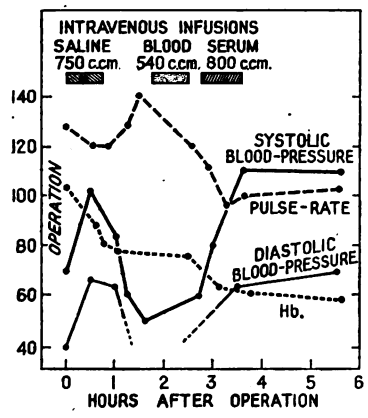

FIG. 4

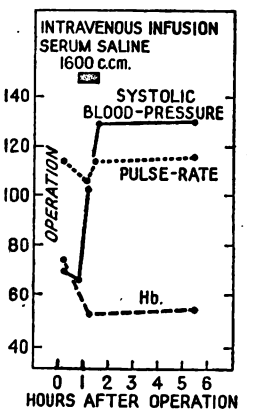

FIG. 5

FIG. 4—Effects of infusions of saline, blood, and serum after radical mastectomy with considerable hæmorrhage (case 2).

FIG. 5—Effects of infusion of serum saline after attempted nephrectomy accompanied by great loss of blood (case 3).

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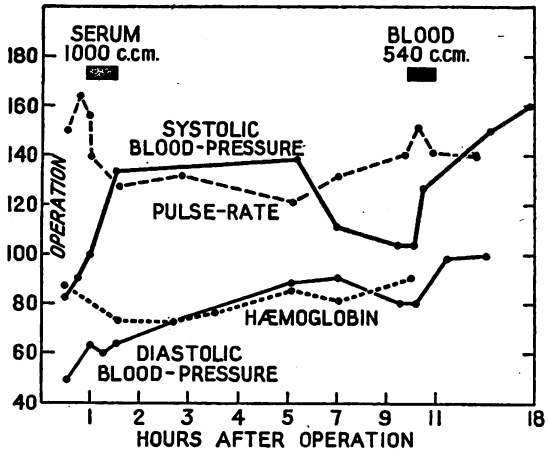

FIG. 8—Effects of infusions of serum and blood after gastrectomy (case 6).

doses of four-times concentrated serum caused improvement, which was maintained. There was dilution of the blood and the blood-pressure rose. Note the high pulse-rate (fig. 9).

Case 7 is an instance of true traumatic shock. It is important to notice that the immediate restoration of blood-pressure was not maintained, progressive concentration of the blood accompanying the subsequent fall of blood-pressure. Later injections of serum, however, were followed by maintained improvement. A similar fall of blood-pressure after the initial treatment is noted in case 6. Points worth emphasis from these two cases are therefore:—

(1) The need for frequent observations of blood-pressure and hæmoglobin in cases of shock, even after apparent restoration of the circulation; (2) the superiority of blood-pressure estimations over pulse-rates in assessing the progress of a given case.

CASE 8.—Man, aged 18. Liver ruptured by lorry wheel one hour before admission. Loss of blood in peritoneum 2·4 litres. Much preoperative improvement due to 540 c.cm. of serum. Blood-transfusion after the operation restored blood-pressure, but the pulse-rate remained high, and there was no maintained dilution of the blood until 48 hours later (fig. 10).

Here the preoperative improvement due to serum infusion gave way to profound postoperative collapse. The blood-pressure was raised and maintained by blood-transfusion, but it was twenty-four hours before the pulse-rate began to fall and the fall in hæmoglobin did not begin until 36 hours after the accident.

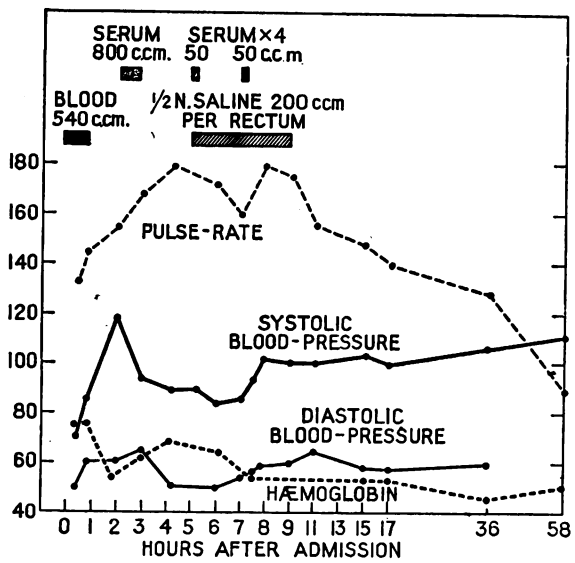

FIG. 9—Effects of infusions of blood, concentrated serum, and saline in traumatic shock due to crushed kidney (case 7).

SUMMARY

Observations of hæmoglobin concentration, blood-volume, and blood-pressure were made before and after infusion with normal saline, hypertonic saline, serum, or concentrated serum in normal people and in patients with postoperative and post-traumatic shock.

Physiological or hypertonic saline given intravenously to normal people is rapidly lost from the circulation.

Serum given intravenously to normal people is retained in the circulation for long periods. The rise in blood-volume depends on the total quantity of protein added, and is independent of the dilution of serum employed.

In shocked patients intravenous saline produces transient benefit only.

Intravenous serum is very effective in overcoming circulatory collapse due to diminished blood-volume.

The recovery of a shocked patient is invariably heralded by a rise in systolic and pulse pressures. The pulse-rate, on the other hand, is a deceptive index of the patient's condition, for it often remains high, even when the blood-pressure has risen to normal.

It is useful to follow the concentration of hæmoglobin in the blood of shocked patients. A rising hæmoglobin means a falling blood-volume, and precedes a deterioration in the patient's condition. Recovery can be forecast if the hæmoglobin is falling, meaning that the blood-volume is being spontaneously restored by dilution of the blood. The retention of infused serum or saline can be gauged by estimating the hæmoglobin.

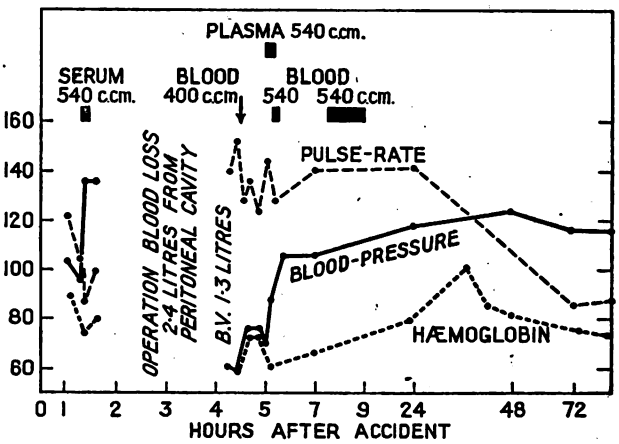

FIG. 10—Effects of infusions of blood and plasma in hæmorrhage due to to rupture of liver (case 8).

We are indebted to the Chief Medical Officer of the L.C.C. for permission to publish this study. We also acknowledge the coöperation of our surgical colleagues and the staff of the pathology department. Dr. A. N. Drury kindly supplied the dried serum. The expenses of the research were defrayed by a grant from the Medical Research Council.

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"... The introduction of the Welfare Office on the Victoria Embankment which assists, in coöperation with voluntary agencies, homeless persons to get back to a normal mode of life, the provision of additional amenities in institutions and the introduction of an almoner service for the council's hospitals are instances illustrating how consideration for the social welfare of the less fortunate citizens of London has become a dominant feature of what was formerly a poor-law service. Moreover, as a result of the war, the public assistance department is now organising the rest centre service and other services considerably wider in scope than those generally connoted by the term 'public assistance.' In these circumstances we consider that a more appropriate name for the Public Assistance Committee would be the 'Social Welfare Committee.'"—From a report presented to the L.C.C. on Dec. 17.

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OPERATION FOR PENOSCROTAL HYPOSPADIAS

By David Levi, M.S. Lond., F.R.C.S.
Senior Surgeon to the Infants Hospital, Vincent Square, London

The following procedure for the relief of penoscrotal hypospadias has given more satisfactory results than has any other known to me. There are three stages of the operation.

STAGE I

The foreskin is buttonholed; the slit is made as near the glans and as long as possible. When this has been done the foreskin should be attached to the penis by two small pedicles. The incisions are carefully and accurately sutured, the incision in the mucosa round the glans being sutured to the skin of the penis, and the mucosa round the cut periphery of the foreskin sewn to the subjacent skin on the dorsal aspect of the foreskin. The corpus spongiosum is excised from the ventral aspect of the penis, the dissection being carried down round the urethral orifice. The penis is thus freed. The urethra should be allowed to slip back as far as it will when the penis is held flat against the anterior abdominal wall. The skin incision on the ventral aspect of the penis is then sutured.

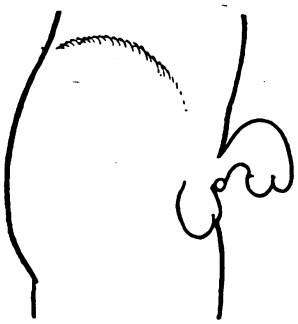

Fig. 1—The curve in the penis in penoscrotal hypospadias.

STAGE II

Two or three months are allowed to elapse before operating again. The second stage should not be undertaken unless the fibrosis and scar tissue resulting from the first operation have disappeared and the original incision is thin and supple. There should be no residual induration. The foreskin should be detached from one end. An incision is now made halfway across the circumference of the attached end of the foreskin; sinus forceps are inserted into this incision and pushed along the tube of foreskin to emerge at its cut free end. The interior of the tube of foreskin is now dilated. After this has been done, it is a simple matter to turn it inside out; the sinus forceps are thrust through the basal incision along the interior of the foreskin, and the distal extremity is seized; the forceps are withdrawn, and the skin follows them. The result is an epithelial-lined tube attached at one end to the penis at the side of the glans. A sharp long thin-bladed tenotomy knife is now thrust into the body of the penis immediately anterior to the urethral orifice and made to emerge at the extremity of the glans at the point where the normal urethra should open. Through the incision thus made the tube of foreskin is pulled. Suprapubic puncture and catheterisation are performed, and the child is sent back to bed. In fourteen days the suprapubic catheter is removed and the attachment of the foreskin to the side of the penis cut and trimmed. As a result of this procedure, there is a new wide urethra running down the centre of the penis. Two or three months are again allowed to elapse till the inflammatory reaction inevitable to the healing process has passed.

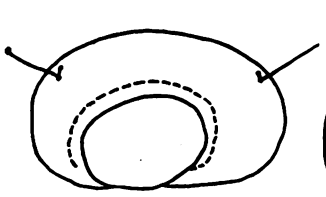

Fig. 2—Glans penis and foreskin held out, showing line of incision.

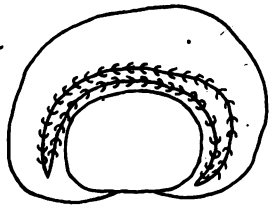

Fig. 3—Glans penis with foreskin sutured.

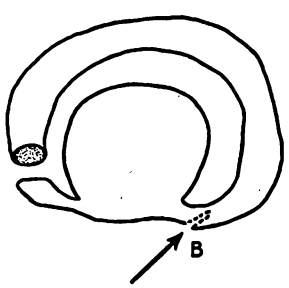

Fig. 5—Stage II of operation; one end of foreskin detached and incision made in opposite pedicle.

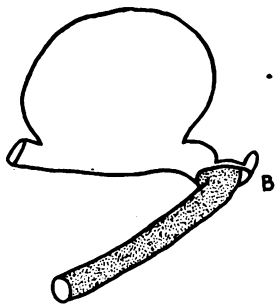

Fig. 6—Foreskin turned inside out through incision B.

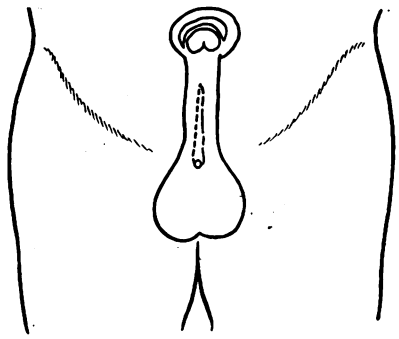

Fig. 4—Ventral aspect of penis after fibrosed corpus spongiosum has been dissected out and removed and urethra allowed to find its natural position.

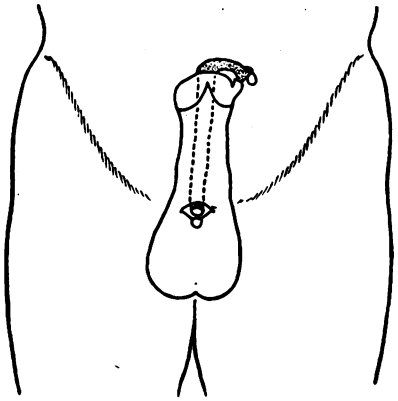

Fig. 7—Foreskin, which is now a pedicle graft with an epithelial lining, thrust down penis to protrude immediately anterior to urethral opening.

STAGE III

This consists of uniting the epithelial tube of the new urethra to the opening of the urethra proper. Again a suprapubic puncture is performed and a catheter introduced into the bladder. With the child under general anæsthesia, procaine and adrenaline are injected into the skin on the ventral aspect of the penis round the two orifices to be united; this ensures a bloodless field. If stage II has been properly planned, it will only be necessary to form the ventral aspect of the urethra afresh. The dorsal aspect is complete. An incision is made in the mucocutaneous junction of the urethra on its ventral aspect and is continued round the opening of the new urethra. The mucosa of the urethra is now sutured to the corresponding layer in the new urethra. This should be done transversely and with the Connell type of stitch. The incision in the skin is sutured longitudinally. The skin edges must be well everted. The suprapubic catheter is removed on the fourteenth day.

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AN OUTBREAK OF PARATYPHOID B IN BRISTOL

BY

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MANY factors combine, under war conditions, to increase the chances of outbreaks of enteric fever or food poisoning, but in recent years improved methods of laboratory diagnosis have become more widely used. Some of the changes resulting from improved technique—for instance the value of fæcal examinations during the earliest days of enteric infection—have not been sufficiently recognised. Partly for this reason and partly to show the importance of confectionery in the spread of infection, it seems worth recording the results obtained in an outbreak which occurred in Bristol this year between May 7 and June 16. During this period 43 cases of suspected paratyphoid B infection were reported to the health department. We investigated them with the help of the senior housing inspector, Mr. F. J. Redstone, and the senior dairies inspector, Mr. H. M. Gould.

Of the 43 cases reported, 30 proved to be paratyphoid B, 2 were typhoid, 3 food-poisoning by salmonella organisms and 8 were simple diarrhœa. The following account is concerned only with the cases of proved paratyphoid infection. The article of food involved was found to be cream pastries, prepared and sold by a wholesale confectionery firm. Of the 30 cases, it was established that 19 had certainly eaten pastries from this shop during the probable period of infection. In a further 7 cases it could not be proved that the pastry eaten had come from the firm concerned, but in the opinion of the investigators it was likely. In the remaining 4 cases no connexion could be established. Of the 4 cases outside Bristol, 3 were definitely traced to pastries from this source, and the fourth was probably so caused. It was impossible to determine whether the cream was infected during preparation or whether the cream pastries were infected as such after manufacture; since the cream was prepared on the premises, the same persons might have been involved in either case. The process of cream-making appeared to offer maximal opportunities for infection, and no pastries other than those containing cream were implicated, so that infection of the cream during preparation seems probable, but could not be proved.

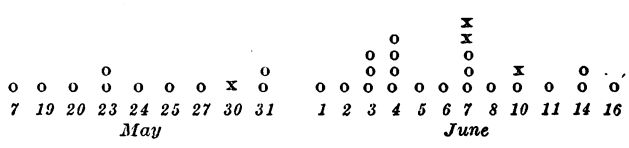
Investigation of the workpeople employed by the firm revealed a carrier who handled the pastry concerned. *Bact. paratyphosum* B was isolated from the stools of this carrier on June 24. A second food handler gave a positive agglutination with *Bact. paratyphosum* B in a dilution of 1/50—but no organism could be isolated from the stools. A third employee, also a food-handler, proved to have organisms of the salmonella group present in the stools. All three were removed to hospital. It is significant that the positive fæcal excreter was at work up to May 28 and cases were reported only up to June 16—that is, 19 days later. On the assumption that she had been an ambulant case previous to May 28, it would mean that she was a reasonable cause of the crop of cases occurring up to June 16. Although she was back at work between June 11 and June 25 we were only able to obtain one positive fæces on June 24, subsequent examination being negative. Thus, by this time, in all probability she had become a very sparsely intermittent carrier and thus caused no further extensive infection.

EPIDEMIOLOGICAL INVESTIGATION

Geographically the cases were scattered throughout the city and no particular district was heavily involved. This scattering was at first puzzling, especially when it became apparent that water, milk and ice-cream could not be incriminated. The regular weekly water analysis made by the laboratory and close coöperation with the Bristol Water Company quickly established the fact that water was extremely improbable as the source of the outbreak, apart from the fact that there was none of the characteristic explosiveness of a water-borne epidemic. Milk and ice-cream were next investigated particularly as there was a relatively large proportion of very young children among the cases. Careful investigation showed no common factor among the cases in relation to either milk-supply at the farm or at the retailer. In the same way ice-cream failed to reveal itself as a common factor although it was highly suspect on general grounds owing to the age of the patients and the season of the year. At this stage we were reluctant to abandon it as a source (90 ice-cream and 60 milk samples were examined bacteriologically). As a working rule an incubation period of 14 days had been adopted in calculating the probable period of infection in each case. This was extended to 21 days and shortened to 7, but this revealed no common factor in relation to milk or ice-cream.

Concurrently with the above, a routine investigation of food had been going on and the families affected had been questioned about articles of food consumed during the probable period of infection. The replies received by our house-to-house investigation were not very satisfactory so we adopted the following plan: an exhaustive list of foods was compiled and a copy left in the evening at each house affected with instructions to fill it in after careful consideration by the whole family in consultation. These lists were collected next day and the results exceeded our expectations. The families affected coöperated excellently and a common factor emerged in a number of cases. In at least 5 cases cream pastry had been consumed and shown to come from a common source. The investigation now proceeded smoothly. The suspected firm was visited by a medical officer and with the willing coöperation of the management every employee was blood tested for Widal reaction and a specimen of fæces obtained for bacteriological investigation.

The frequency of the cases was as follows. (Dates are those of onset of illness. Bristol cases o, outside cases x.)



The age-groups were:—

	Years 2–5	5–10	10–15	15–20	over 20
Cases	10	4	3	8	5

BACTERIOLOGICAL INVESTIGATION

Over 500 specimens (foodstuffs, fæces, sera) were examined during the course of the epidemic. The use of tetrathionate broth (Schäfer 1934–35) for concentrating the paratyphoid bacillus was an invaluable means of isolation. It was shown in the Liverpool epidemic (Glass and Wright 1937) that this method gave a high percentage of positive results in paratyphoid cases, especially during the *early* weeks of the disease—so that during the first 2 weeks the diagnosis was more likely to be successful as the result of examining fæces than by performing a Widal agglutination on the patients' serum. That is contrary to the teaching of most textbooks, and is due to the superiority of this medium to that of direct plating on McConkey.

The examination of foodstuffs was also made easier, because reasonably large quantities of material could be placed in flasks of this liquid medium, or considerable amounts of washings from such bulky materials as lettuces and tomatoes could similarly be added. The investigation of the cream pastries presented difficulties. The examination of several grammes of synthetic cream from even 50 different pastries is probably a very inadequate sample of the material distributed by the firm, who prepare some 4000 pastries each day. In addition, infection would in all probability be intermittent and incomplete. Abundant evidence of fæcal contamination was obtained

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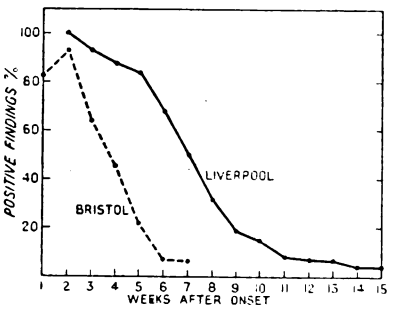
as *B. coli, B. proteus* Morgan and *Strept. fæcalis* were all isolated. But even this contamination could not be proved to be of human origin, because similar organisms were obtained from an egg-powder ("chinese eggs") used to make the synthetic cream. These organisms probably came from the birds laying the eggs, and served to obscure any subsequent human contamination. An egg-powder from another firm gave on one occasion an organism of the salmonella group, identified by Dr. W. M. Scott as a relative of *Salmonella thompsoni* similar to one isolated from duck eggs. As a result of these difficulties we failed to isolate *paratyphosum* B from the cream.

The epidemiological evidence suggesting infection by the pastry was on the other hand very strong, so that full examination of the workpeople was undertaken. The use of the Widal reaction as a means of detecting enteric carriers has received much support in the literature (Pijper and Crocker 1937). Whether a routine agglutination reaction is always capable of detecting them seemed to us doubtful in view of the fact that the carrier in the Liverpool epidemic (Frazer, Glover and Glass 1937) had a titre of only 1/20 for *Bact. paratyphosum* B (H) and was negative at this titre for *Bact. paratyphosum* B (O). This suspicion was confirmed by the isolation in the Bristol epidemic of organisms from a carrier with a negative agglutination reaction (lowest titre 1/25) for T.A.B. (H) and T.B (O). This carrier was taken into hospital but the fæces became negative and despite repeated examination have remained negative since. The Widal was repeated later but remained negative. Probably the patient was a mild case rather than a true carrier.



The possibility of infection with little result so far as agglutinins are concerned is illustrated by the infection of one family with the following results. The child was taken ill on June 4; on the following 11th the organism was isolated from the fæces and the Widal gave agglutination of *paratyphosum* B (H) at 1/125. On June 14, the fæces and blood of the parents were obtained. The mother was said to have had diarrhœa on the 4th and the father was said to be well. *Paralyphosum* B was isolated from both fæces and was agglutinated by H and O specific antisera. The Widal of the father was positive at 1/50 for *Bact. paratyphosum* B (H) but that of the mother was completely negative. A month later she agglutinated *Bact. paratyphosum* B (O) to 1/125, *B. typhosus* (O) to 1/50 but was still negative for *Bact. paratyphosum* B (H) 1/12.

Another point brought out by this investigation in regard to the interpretation of the Widal reaction was that the occurrence of (O) agglutination in the absence of (H) does not always mean typhoid-paratyphoid infection. Two cases of *B. aertrycke* infection gave titres of 1/125 with *B. typhosus* (O), were negative for *B. typhosus* (H) and *Bact. paratyphosum* B (H) and agglutinated *B. aertrycke* suspensions at dilutions of 1/125 and 1/250 respectively (H and O).

In some cases considerable cross-agglutination with typhoid (H) suspensions (Wyllie 1937) was observed, titres as high as 1/250 being obtained (*Bact. paratyphosum* B (H) 1/1250, in this case). All suspensions used in the laboratory are Oxford standard suspensions.

Fæces were obtained as early as possible from all cases and suspects. They were examined by the tetrathionate concentration method and then plated on McConkey. The percentage of positive findings at varying intervals after the date of onset of illness for proved cases reveals some interesting features (see figure). From 1 to 7 days after onset the percentage positive was as high as 83% and from 8 to 14 days 93%. These high percentages, occurring so early, agree with the results obtained in the Liverpool epidemic (Glass and Wright, 1937). Our percentage then fell rapidly, being only 20% in the fifth week. These cases have evidently become negative much more rapidly than in the Liverpool epidemic, where a similar figure was only obtained after an interval of 9 weeks. Whether this was the result of varying virulence or due to differences of treatment is a matter of supposition. Differences of efficiency in the technique of isolation can scarcely be the explanation, for we obtained almost as high a percentage in the second week as Glass and Wright (actually, only 1 case was negative).

Days	*1–7*	*8–14*	*15–21*	*22–28*	*29–36*	*37–44*	*>44*
Total cases	6	15	14	13	27	28	29
No. positive	5	14	9	6	6	2	2
Percentage	83	93	64	46	22	7·1	6·9

SUMMARY

Patient verbal inquiry gave no clue to the source of infection. It was not until the whole family had pondered at leisure with the aid of an exhaustive food questionnaire that clues were obtained.

The value of early examination of fæces by the tetrathionate concentration method is fully confirmed by our results. The limitations of the Widal reaction are discussed.

Over 200 contacts were visited and investigated but there was no instance of a secondary case arising by contact. The whole outbreak appears to have arisen from the consumption of infected cream in each of the cases reported.

We wish to record our thanks to Dr. R. H. Parry, M.O.H. Bristol, for permission to publish, and to Prof. W. W. C. Topley and Dr. W. M. Scott for much helpful criticism.

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AGRANULOCYTOSIS AFTER SULPHAPYRIDINE THERAPY

WITH RECOVERY

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THE following case-history is recorded partly because agranulocytosis is still relatively rare after treatment with sulphapyridine, but chiefly because recovery took place after complete or almost complete agranulocytosis for 4 days. In the previously recorded cases, of which we have been able to trace 13, no patient survived who was proved to be in this precarious state for more than 2 days.

CASE-HISTORY

A married woman, aged 52, was admitted to Mount Vernon Hospital on May 14 with bronchopneumonia at both bases. The sputum contained moderate numbers of pneumococcus, streptococcus and *Micrococcus catarrhalis;* pneumococcal typing was not performed. Blood-count; white cells, 27,500, with 92% polymorphs. She was given moderate doses of sulphapyridine, and her temperature fell but subsequently became swinging. The drug was continued until May 27, when the white-cell count was slowly falling and she had developed a morbilliform rash on the arms, neck, thighs, and buttocks. At that time she had had 43 g. of sulphapyridine in all. The rash faded within 12 hours, but next day she developed a sore throat. The temperature remained normal for 4 days, but the white-cell count fell progressively. On May 31 sodium nucleinate 2 c.cm. (5% solution) was injected intramuscularly; this dose was repeated on the 2 following days. On June 2 the patient appeared desperately ill, the temperature again rising steeply; although she managed to take fluids by mouth in small quantities throughout this period, she afterwards remembered nothing of her condition

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for the next 3 days. On the 3rd only 2 basophil polymorphs were seen out of 70 white cells counted in a blood-film; for the next 2 days there was complete agranulocytosis. On the 6th only an occasional granulocyte could be found. Intramuscular injections of pentnucleotide were started on June 3 and continued for 4 days in heroic dosage, the total exceeding 400 c.cm. An initial intravenous injection of 10 c.cm. was also given, and a blood-transfusion of 1 litre was administered by the drip method. The fluid intake was maintained by drip rectal glucose-saline. On the 8th the white-cell count was 26,500; granulocytes 94%, nearly all with single-lobed nuclei. She developed a right tonsillar abscess and later an abscess in the right buttock, at the site of the pentnucleotide injection. The white-cell count rose, and by the 11th, when the abscess had become fluctuant, had reached 75,000. On the 14th the abscess was opened; the pus gave a pure growth of *Staphylococcus aureus*. By the 17th the temperature had fallen from 101° F. to 99° F., and the white-cell count from 63,000 to 15,000. Recovery was uneventful except for a *Bacillus coli* infection of the urine, which was successfully treated with mandelic acid. A blood-count on July 10 showed: Hb. 90%; white cells 8700 (polymorphs 44%, lymphocytes 53%, large mononuclears 3%).

DISCUSSION

The total dosage of sulphapyridine given was 43 g. in 18 days, well below the 50 g. which Sutherland (1939) considered dangerous. Granulocytopenia may be produced in some cases by massive dosage of the drug, whereas in others in which the dosage has been small (Tzank 1939, Spain 1940), individual sensitivity appears to be responsible. There remains a group, less easily explained, in which the dosage has been moderate. Of the 13 reported cases, 6 developed granulocytopenia during their second course of the drug; of these 1 had massive dosage (Barnett 1939) and 1, Tzank's case, was certainly sensitive to many different agents. Sensitisation may perhaps be produced in a first course of the drug and only revealed in a second. Hudson (1935) found that in cases treated with gold, half of those which developed purpura did so early in their second course of injections.

The presence of a drug rash cannot be taken as being of serious import. It occurred in 2 of the reported cases (Briggs 1939), both of which recovered. Many rashes also appear in patients with no granulocytopenia. The maximum fall of polymorphs in this case was not reached until 7 days after sulphapyridine had been discontinued. In Briggs's first case (1939) 12 days elapsed before the granulocytopenia reached its maxium, and other recorded cases make it clear that, as already emphasised by Montuschi (1940), any suspicious case should have frequent white-cell counts for a considerable time after the drug has been stopped. The recovery of this patient after 4 days of agranulocytosis is remarkable. Injections of sodium nucleinate were begun before agranulocytosis occurred, and were followed by large doses of pentnucleotide, but no leucocyte response was obtained until the eighth day. Briggs found the same thing in his first case; his patient, however, never had complete absence of granulocytes. A fall of lymphocytes accompanying the granulocytopenia is common; 7 out of the 13 recorded cases had lymphocyte counts of under 2000. This finding does appear to make the prognosis slightly worse since 4 of these 7 were fatal, while only 5 out of the total of 13 cases died.

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The next term at St. Thomas's Hospital Medical school will begin on Jan. 2. Premedical and preclinical courses will be held at the new school centre at Godalming and a full clinical curriculum has been arranged in sector 8. The dean's office remains in London and further information may be obtained there.

Medical Societies

ROYAL SOCIETY OF MEDICINE

SECTION OF SURGERY

AT a meeting of this section on Dec. 4, with Mr. J. B. HUNTER, the president, in the chair, a discussion on

Chest Injuries

was opened by Mr. C. PRICE THOMAS. He said that in war chest wounds were second in their mortality-rate only to abdominal wounds. The factors which make them so deadly chiefly depend on interference with the cardio-respiratory reserve, due to the presence of air or blood in the pleural cavity. Open pneumothorax, besides collapsing a lung will cause a pendulum-swing of air between the lungs. Mediastinal flutter will be set up and aspiration effects produced in the great veins, to reduce the diastolic filling of the heart. These factors, if not checked, will all lead to death from anoxæmia. They are more dangerous in the old than in the young. In combating shock it is important to replace as early as possible the circulating colloids and to cut short the period of peripheral anoxæmia, the factor which damages the capillary bed. Oxygen should be given as well. Patients who survive the first 48 hours may succumb later from sepsis of the pleura or lung or both. This results from retention of a foreign body, bad laceration or necrosis of the tissues, or other conditions favourable to the further growth of infective organisms. The pleural cavity in hæmothorax provides an ideal culture medium. The surgeon should aim at removing not only the nidus but also the culture medium, and at inducing expansion of the lung as soon as possible to obliterate the pleural space. By doing so not only the mortality-rate but also the period of convalescence is reduced, and perhaps the chronic invalidism of later years. An insufficiently treated hæmothorax may organise in a mass of fibrous tissue and prevent expansion of the lung; this is another cause of late morbidity. A just balance must therefore be held between the necessity for intervention, the immediate risk, and a longer view of the prospects of morbidity. An accurate history of the circumstances is of great value, and knowledge of the position of the patient when hit may give a guide to the direction of the missile. Radiological evidence is indispensable. Anteroposterior and lateral films are both necessary; one anteroposterior film should if possible be a penetrating one, to reduce the risk of missing a foreign body. Radiograms are essential too in the after-management of the case. Whenever possible operation should be performed within 6 hours of the infliction of the wound. The chief indications for operation during this period are open pneumothorax, overt and progressive hæmorrhage, hæmothorax with a retained foreign body, and suspicion, from the direction of the injury, the position of a foreign body, or other evidence, that the diaphragm, heart or pericardium have been injured. Cases which will not need intervention are those of a through-and-through wound without hæmothorax or hæmoptysis, or where the entry wound does not constitute a sucking wound. The most important prerequisites for successful operation are an anæsthetist skilled in the management of thoracic cases; good light not only overhead but also from an efficient portable lamp within the thorax; and an efficient rib-stretcher. For the operation the patient lies on his side with a sandbag in his axilla. Brock's chest-rest will fit any table and is a valuable aid. An essential of the operation is a complete surgical revision of entry and exit. A wound situated in a place where thoracotomy could normally be performed may be enlarged and the chest opened through it. The temptation to explore through an ill-placed incision should be resisted at all costs. A thoracotomy of six or seven inches is usually ample, but a wound should be extended without hesitation to give sufficient access. Immediately after the operation the patient is nursed lying down, but as soon as his general condition allows he is gradually raised to a reclining position. Oxygen is as necessary after as before an operation. Patients who have undergone primary operation outside a chest centre should be

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transferred to one as soon as possible for better post-operative care.

Dr. J. L. LIVINGSTONE said that the ordinary clinical signs are difficult to obtain in these cases, and there is therefore all the more reason to search for the essential ones—sputum, coarse sounds, and changes in the position of the apex-beat and the trachea. Internal injury may be present without external wound, and the size of the entry wound is no guide. It is useful to visualise the course of the missile. Wounds of the lower chest may be associated with sudden onset of abdominal rigidity exactly simulating peritonitis. An essential instrument in diagnosis is an exploring-needle of good size—13 or 14 wire gauge, preferably with a two-way tap between the needle and the syringe. The diaphragm is commonly high. Offensive-smelling blood withdrawn from the pleura is certainly infected, and anaerobic culture is worth asking for. In the presence of infection the needle should be used cautiously. Radiological diagnosis has a number of pitfalls. A considerable quantity of fluid may be present, particularly at the left base behind the heart, and cause only slight opacity in the film. A collapsed lower lobe may be masked by the heart shadow; metallic foreign bodies may be quite invisible unless a penetrating film is taken; blood-clot may simulate bile shadows and suggest a ruptured diaphragm. Patients are furiously hungry, and, even if they have a temperature, require full and varied diet with extra vitamins. The usual hospital diet is deficient in vitamins B and C. Anæmia is common and iron should be given as a routine. A suspension of washed blood-cells in 5% glucose raises the hæmoglobin impressively. In shock large amounts of plasma are required quickly. In using sulphapyridine against pneumococcal infection a uniform scheme of dosage is important and the dose should be noted on the temperature chart. The drug should be withheld until the effect of adequate drainage has been seen. In more than one case of meningismus the drug has prevented meningitis. Skilled nursing is important, and bedsores should be watched for. Patients should be encouraged to make active movements of the spine and limbs and to get up as soon as possible. A drainage-tube should not keep the patient in bed if there is no toxæmia. Patients need encouragement and entertainment; occupational therapy has been found useful. Physiotherapy should include special breathing exercises to promote expansion of the lung and ensure proper diaphragmatic breathing. The masseuse should be specially trained in work with these cases and should be selected for her personality and power of making the patients persevere with their exercises. These should be started early, but in pneumothorax it is wise to wait a week. Other exercises should aim at preventing deformities of the chest and spine. Infrared rays are useful for chronic wounds and diathermy for intrathoracic sepsis. General ultraviolet light baths seem to have a tonic effect in some debilitated cases.

Mr. NORMAN BARRETT said that if the patient is seen within a few hours of the injury the wound, unless it is small and uncomplicated, should be excised. It is rarely justifiable to close a chest wound. After operating on a sucking wound which has been excised the surgeon must close it to avoid an open pneumothorax. If the excision has not been thorough the wound should not be sutured but covered with a large pad. Packs encourage sepsis and hinder drainage. The most difficult wound to excise is one in which the missile has penetrated the scapula and damaged muscles and ribs; it may be necessary to make a separate incision and to lift the scapula off the chest wall. Fractures of the thoracic cage are apt to introduce a special risk by impairing its mechanical stability. Crush injuries are more likely to break the ribs than other bones. Simple fractures of ribs are either direct or burst fractures; in the latter the force is transmitted round the rib to its weakest point and the cage bursts outwards. This is commoner in the upper part of the chest. Such fractures are seldom comminuted but are clinically important because they cause pain and sometimes hæmothorax. Fractures of the ribs may be complicated by traumatic asphyxia and acute dilatation of the stomach. If coughing is painful or ineffective, the vomit may be partially inhaled. The importance of a simple fracture lies in the possibility that the movements of breathing may be limited by pain or rendered ineffective by an unstable chest wall. Breathing may be controlled by strapping the chest over a wide area. The other indication for immobilising part of the chest is paradoxical movement. Compound fractures of ribs are usually due to penetrating foreign bodies. They have been neglected because surgeons appear to be frightened of creating or enlarging open wounds of the pleura. The outlook is more serious in bullet-wounds if the rib has been struck, for the bullet may have been set spinning on its short axis. The gravity of thoracic wounds involving the vertebral column depends on whether the spine has been injured. Simple fractures of the sternum cause pain, ecchymosis and sometimes a palpable deformity.

Dr. W. D. W. BROOKS mentioned the use of the Nuffield respirator in nursing multiple fractures of ribs. It obviates paradoxical movement and overcomes the dyspnœa from which these patients so often die. Two patients from Dunkirk with hæmothorax, one with a foreign body as well, became œdematous after a week and ten days respectively. The usual causes of œdema were excluded, but there was a reduction of the total quantity of proteins in the serum, chiefly of the albumins. The blood in the hæmothorax was much diluted with serum. Observations were made on every case in which large amounts of serum might have been lost through a drainage-tube, and in a certain number of them the level of the blood protein was altered. The level is probably maintained up to a critical point and then falls rapidly. The treatment is simple—an intravenous injection of serum. Preserved plasma is not so concentrated and contains Merthiolate, which in considerable quantities is dangerous to the kidneys.

Mr. J. E. H. ROBERTS spoke of contra-indications to operation. One of the most important is, he said, blast injury of the lung. Of two patients whose abdomens had been opened for intense abdominal symptoms, neither presented any lesion and this was the cause. If a batch of bomb casualties contains one blast case it probably also contains others, even though signs and symptoms are lacking. These sometimes appear after 48 hours, for the lesion is progressive. Bleeding from the capillaries into the lungs may continue for several days before death, the length of time depending on the amount of hæmorrhage. Some cases show minute punctiform hæmorrhages in the skin of the abdomen, chest and front of the arms; others suffer from slight dyspnœa, cyanosis and increase of pulse-rate, or from rigidity and tenderness of the abdominal wall. At autopsy the intercostal muscles may be infiltrated with blood. Blast effects should always be suspected in every batch of bomb casualties, and no operation should be performed under a general anæsthetic until the surgeon has ascertained that the effects on the lung are not progressive. Blast cases require oxygen early, and some are better with morphia. Cerebral irritation may be so intense that they cannot be given oxygen. The other contra-indication to operation is poisoning by carbon monoxide.

Dr. M. D. NOSWORTHY said he had seen no ill effects from Pentothal sodium, though it may be contra-indicated because of its respiratory depressant action. The presence of copious tracheo-bronchial secretion has seldom been a prominent feature. He mostly uses the pharyngeal airway; when secretion is present, an endo-tracheal anæsthetic, with provision for adequate suction, is essential. Aspiration of the tracheo-bronchial tree may be life-saving. He described the uses and value of controlling the breathing by squeezing the mixing-bag.

Mr. P. N. CUTNER pointed out the danger of missing a tuberculous lesion through its shadow being masked by a large foreign body.

Mr. O. S. TUBBS said that patients wounded in the chest travel extraordinarily well. Crush injuries, and staving-in of ribs inside the thoracic cage, are becoming more common; they are being treated simply by strapping.

Mr. R. C. BROCK said he was impressed with controlled respiration and was sure it repaid careful attention, especially in saving patients who were moribund from loss of blood. The surgical treatment of chest wounds is, he declared, more a problem of administration and organisation than of surgery—getting a patient to the operating-table in time for intervention to be of any use. The two points which cause anxiety are the treatment of

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a chest-wall wound, and what should be done inside the chest. The problem of making or enlarging a hole in the pleura has been shirked. The surgeon should have no fear about doing this; moreover, if he leaves a fractured rib, contaminated with a retained foreign body and leading down to a hæmothorax, he is not fulfilling his surgical duties. Once the chest has been opened by thoracotomy the pleura must be properly cleared out. The lung is very tolerant of direct interference.

Reviews of Books

Textbook of Dietetics

By L. S. P. DAVIDSON, M.D. Edin., F.R.C.P., F.R.S.E., professor of medicine and clinical medicine in the University of Edinburgh; and I. A. ANDERSON, M.B. Aberd., clinical tutor and assistant in the metabolic wards, Royal Infirmary, Aberdeen. London: Hamish Hamilton. Pp. 324. 10*s.* 6*d.*

THE art of dietetics has a history stretching far into the past; the science of dietetics has only recently achieved recognition; and the union of the art and the science has only just become possible. As a consequence, up to now books on dietetics have tended to be of one of two types. Those based on the art of dietetics have, save in relation to one or two special diseases, been largely empirical in teaching and glorified cookery-books in practice; while those based on the science have typically been highly technical accounts of experimental investigation unintelligible to all save the expert. The need for a book by writers with first-hand knowledge of both the art and the science has long been felt and Professor Davidson and Dr. Anderson have now met this need. Both are in a position to criticise and assess the different aspects of their subject and they have not hesitated to do so. Dietetic fallacies long rooted in clinical tradition are ruthlessly exposed and speculations on, as distinct from the facts of, modern investigations are judiciously discouraged. The result is a book whose practical and sound teaching will command the confidence not only of students of dietetics but of practitioners in medicine.

The book is divided into five parts. In the first are discussed the different diets available to the different economic classes of our present society and the effects of such diets on development and health. This aspect of the subject is confusing only in so far as it has been made so by political propaganda. When the facts are presented as objectively as they are here, it is neither difficult to assess the actual position nor to envisage the necessary solutions. The second part deals concisely but adequately with the physiology of nutrition. The exposition is made with such lucidity that anyone, even if his student days are long past, can gain from it the principles on which rational dietetics are based. In the third part the dietary requirements in the periods of physiological stress are considered and the genesis of ill health at such times and the appropriate measures for its prevention and cure are discussed. The fourth part is concerned with the dietetic treatment of disease, and in this the writers have set and carried through a high therapeutic standard. "No dietetic restriction should be imposed that cannot be justified on physiological, biochemical or clinical grounds. To withhold much desired foods on no better sanction than fashion or tradition not only discredits the practice of dietetics but may inflict misery and harm on the suffering patient." This standard has necessitated the clearing away of much empirical lumber from clinical dietetics and its replacement by tested new knowledge, but the result is that in these pages the physician will discover a system of dietetic treatment which is capable of rational application. The fifth part gives tables of recipes and diet sheets and it is for this part that the busy practitioner will be most grateful. Ingenious schemes for simplifying the prescription of different diets often add to the patient's confusion; when a diet is prescribed what the patient needs is a menu, and scores of appropriate menus are given in this book.

It is a pity that the authors have not dealt with the subject of sensitivity to food. Their robust common sense might have swept away many myths from this subject to the advantage of those who have to deal with practical dietetics.

Statistical Calculation for Beginners

By E. G. CHAMBERS, M.A., assistant director of research in industrial psychology, University of Cambridge. London: Cambridge University Press. Pp. 110. 7*s.* 6*d.*

Mr. Chambers has set out to explain as simply as possible how to perform the calculations involved in the statistical methods most commonly used—the calculation of averages, measures of dispersion, correlation coefficients, and tests of significance of various kinds for small as well as large samples. From the last he omits rather unexpectedly the standard error of a proportion and of the difference between two proportions. His description of the steps required is mainly very clear, though sometimes rather condensed, and is well illustrated by numerical examples, while those who like mathematical symbols have not been neglected. He naturally writes with an eye on psychology and draws his examples from that field, but his little book should prove equally useful to workers in other sciences.

A General Zoology of the Invertebrates

By G. S. CARTER, fellow of Corpus Christi College and lecturer in zoology in the University of Cambridge. London: Sidgwick and Jackson. Pp. 501. 25*s.*

MUCH of our knowledge of the principles of animal biology has been gained from research on invertebrates. They present such a variety of structural and physiological adaptations that there is scarcely a group which is not especially suitable for the investigation of some fundamental problem which for technical reasons is less easily attacked in a vertebrate. The structure of protoplasm, genetical cytology, amœboid and ciliary movement, nervous transmission, fertilisation, growth and regeneration are a few of the many subjects for which certain invertebrates afford particularly suitable experimental material. Unfortunately the many general books on invertebrate zoology are almost exclusively morphological. Dr. Carter's work is therefore especially welcome for students and particularly those who intend to do experimental research in any branch of animal biology. The subject matter should be included in any second-year honours course in zoology. The book has been admirably planned and is well illustrated, but the student may find the style rather ponderous.

The Microscope

By R. M. ALLEN. London: Chapman and Hall. Pp. 286. 15*s.*

ALL laboratory workers agree about the need for understanding the physics of the microscope but apart from the motor-car it is perhaps the least well understood of popular scientific instruments. The trouble is that the modern microscope works so easily and so well that we are content, in our ignorance, with something less than half its possible efficiency. Mr. Allen's chapters on the optical principles of the microscope and on critical illumination are clear and to the point, and well within the reach of lay understanding. Dark-ground illumination is a technique to which too little attention has been given in this country and the description of its theory and practice should encourage the reader to explore its many uses. On the historical side Mr. Allen has many interesting things to say and no-one who wishes to know the history of biology can afford to ignore the development of the microscope. The book is well supplied with clear-cut diagrams but it is over-burdened with photographs of the various makes of instruments which are readily available in makers' catalogues. The later sections deal with the preparation of material for examination—a vast subject on which the author has tried to say too much in too little space. Dirty microslides are a perpetual bane to the laboratory worker but the author's recipe for removing grease—chromic acid, or alcohol and hydrochloric acid, followed by wiping with a clean cloth—is, in its last instruction, almost a guarantee that new grease will replace the old. The book has a bibliography and a glossary and deserves a place on the laboratory bench rather than on the bookshelf.

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THE LANCET

LONDON: SATURDAY, DECEMBER 21, 1940

ANÆSTHESIA IN THE SHOCKED PATIENT

A MONTH ago two young surgeons who have studied continental experience objected in our correspondence columns[1] to a categoric statement in M.R.C. War Memorandum No. 1 that to induce anæsthesia in a shocked patient gas and oxygen, combined with ether if necessary, is the mixture of choice. This recommendation was qualified by the proviso that a skilled anæsthetist with the necessary apparatus must be available and cyanosis be avoided, otherwise ether alone should be used. Chloroform and spinal anæsthesia were ruled out and emphasis laid on the special care to be taken in giving any anæsthetic to a shocked patient. Our correspondents insisted on the primary importance of using local and regional anæsthesia in these cases and related the experience of a team of surgeons during the Finnish campaign who were able to compare the condition of wounded men on two operating tables, one being used for general the other for local anæsthesia, and who found that when local anæsthesia was used the patient came out of his shocked condition while on the table. They conclude that methods of local anæsthesia should be further explored in the prevention and treatment of wound shock. It will probably be conceded that any form of noxious inhalation is to be avoided in patients who show signs of shock. Even if we do not go as far as PICKRELL in regarding every circulating narcotic as an assault on the integrity of the body,[2] yet we must still regard a general anæsthetic as a noxa, however mild in degree, which may be faced with impunity by the healthy person undergoing operation at a chosen time and place, but is never negligible when the circulation is depressed by tissue damage or loss of blood. Overruling every other consideration is the need to relieve pain, although it must be borne in mind that no decisive evidence was presented to the M.R.C. committee that painful nerve impulses play any large part in the causation of traumatic shock.

Stated as an abstract proposition there is no question that local anæsthesia abolishes shock and that its after-effects are less depressing than those of a general anæsthetic. Visitors to surgical clinics such as those of Zürich or Berne a decade ago when they were directed by masters of technique like CLAIRMONT and DE QUERVAIN were impressed by the spectacular success of block and infiltration anæsthesia, although they were uncomfortably aware that the success was not uniform. Unfortunately too it lowers the blood-pressure. This however does not apply to the arm, where brachial-plexus anæsthesia is well-nigh perfect for a shocked patient. The head too, and the face, can be operated upon under local anæsthesia whereas conduction anæsthesia in the lower limb is uncertain and difficult to carry out. But in a practical world we cannot overlook the fact that local anæsthesia has a technique which is not acquired overnight and good results will only be obtained by those who possess the skill to use it effectively. Little opportunity for gaining this experience is offered in schools where specialist anæsthetists have brought their art to a smooth consummation so comforting to the busy surgeon, and DODD has stated clearly[3] why local anæsthesia cannot be popular in teaching hospitals. Moreover regional anæsthesia presupposes apparatus which requires a team of trained attendants and at the present time all the paraphernalia of syringes and needles are hard to come by. The principles may be sound enough but the difficulties in putting them into practice may be insuperable. The final objection to the use of local anæsthesia for air-raid casualties remains to be stated: in the majority of cases the injuries are multiple and it is not practicable to anæsthetise several areas of the body at once.

Three words only need be said about the choice of a general anæsthetic. There is none. It matters little what anæsthetic, barring chloroform, is chosen so long as the correct quantity is given and the administrator is familiar with his task. The safeguard of nitrous oxide is that, given with sufficient oxygen, it is simply impossible to procure deep anæsthesia; and no-one in his senses would add anoxia to the other risks of shock. TRUETA, who is now working at the Wingfield Hospital, Oxford, regards ether as the safest anæsthetic in dealing with air-raid casualties; it is easily portable and in emergency one anæsthetist can supervise two or three tables near him.

WANTED: A LEAD

Sir WILLIAM BRAGG lately made a plea for greater coöperation between science and the state.[4] "We do not claim," he said, "that men of science shall be entrusted with authority because they are men of science; we do claim that authority shall be exercised in the light of a knowledge which grows continuously, and with continual effect on politics, on industry, and on thought itself. If at present the only way to bring this knowledge into use is to treat men of science as consultants, let us take that way. But we shall be taking the better way if in all ranks of the State . . . we can arouse a general appreciation of the position. . . ." Many have deplored that advances in medical knowledge take so long to filter through to the official health services, and that central health departments do not always give that energetic lead in the shaping of health policies that ought to be their function and their privilege. This is not necessarily a reflection on the medical officers of these departments, who have numbered many famous and active men. Rather may it be a commentary on the conditions under which they have to work. The heads of our health services are politicians, and the officers directly responsible to them are administrative civil servants who regard their professional advisers as consultants whose advice may be taken or left as suits prevailing political fashion. The politician is not always a man of vision and he may regard his political future as being inconsistent with a line which his department wishes him to take. His senior administrative colleagues, who influence so largely departmental policy, may not all be men of

1. Ruscoe Clarke and Lipmann Kessel, *Lancet*, Nov. 23, 1940, p. 664.
2. Pickrell, K. L. *Anesth. & Analges.* 1940, **19**, 272.
3. Dodd, H. *Brit. med. J.* 1940, **2**, 348.
4. *Nature, Lond.* 1940, **146**, 731.

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great vision either, or they may be torn between a desire to fall in with the views of their political chief on the one hand and their professional officers on the other.

It is politically unsound to be ahead of public opinion, and the forces of inertia are heavily loaded against progress that is deemed to be before its time. It is perhaps for this reason that our central health departments are unwilling to give the public what is good for it as distinct from what they think it wants. The most certain way of securing health legislation is by well-directed pressure from outside. Central action then becomes a reaction to external pressure and it is sometimes amusing to observe the zeal with which politicians hasten to assume the paternity of babies previously unwanted. For some years the central health departments have been damning with faint praise immunisation against diphtheria; only recently, and in the face of considerable external agitation, have they begun to urge effective action. There is a considerable body of opinion hostile to immunisation, as to many other things, but that should not have prevented the departments from launching a determined and unceasing drive in favour of immunisation as soon as they were satisfied that it was a valuable health measure.

The times are propitious for a new conception of the place of the central departments as a constructive force in shaping health policy, and most doctors will not be slow to follow a strong lead. The nation should be made to realise that medicine has a real contribution to make towards the solution of many war and post-war problems. "Science," as Sir WILLIAM BRAGG said, "is not a devouring monster, but a means of service.... There is a prime danger if those who are in the position to use it rightly shut their eyes to its presence and its power. . . ."

TRAUMA AND CANCER

UNTIL the present century the causation of cancer was an entire mystery. Today we can distinguish several causes—synthetic chemical compounds, natural hormones, viruses, and different kinds of radiation including ultraviolet light and α, β and γ rays—but dark corners remain where ignorance still abides, often barricaded behind the litter of the past. At least we could now clear the lumber out of the way. Mr. CECIL JOLL[1] complains that "our textbooks of surgery, medicine and pathology, to say nothing of many monographs on cancer, almost without exception expound the view that a single trauma . . . is of itself capable of producing a malignant growth at the site of the trauma." The candidate for a medical diploma or degree is, he says, expected to apply the term "traumatic cancer" to certain tumours of the breast and other organs. Our courts of law from time to time endorse this teaching by awarding damages when a cancer has developed at the site of an injury. It is true that to claim compensation on account of traumatic cancer is somewhat speculative, and to win his case the client will need capable expert witnesses on his behalf, but it is surprising that he should ever succeed. Now and then cases which seem to be examples of traumatic cancer are published. We read of the gentleman who burnt his eyelid with cigar-ash; the little burn never healed and ultimately a rodent ulcer appeared at the injured spot. A reasonable interpretation of the case is to assume the existence beforehand of a small basal-cell carcinoma to which the hot cigar-ash directed attention. Again there is the tar worker who received a splash of hot tar on the back of his hand, the accident being followed after a short interval by the growth of an epithelioma at the site of injury. Common sense is not outraged if the tumour in this instance is attributed to tar rather than to the burn. A woman who had remained well for five years after mastectomy for cancer dropped a weight on her foot, fracturing a metatarsal which became almost at once the seat of a malignant growth. Whatever her clinical notes and pathological reports may say, it is almost certain that a metastatic new growth was already present when the bone was broken. Apart from explanations of this kind, in a world of many millions coincidences will sometimes happen and cancer will appear in tissues which have been recently hurt, though the cancer has no causal relationship with the trauma. In the laboratory no-one has succeeded yet in causing cancer by simple traumatism.

A doctor's attention cannot be confined entirely to the disease from which his patient is suffering—his duty includes the easement of the sick man's mind, and when a sufferer from cancer asks "what caused this trouble?" the reply may well be "probably some small injury which you perhaps have forgotten." Such an answer, confidently given, at least dispels some of the fear of the unknown. Moreover, an injury is a clean affair, free from any moral stigma and unassociated with implications of family taint or with unpleasant objects, past habits and experiences which are painful to remember. The great disadvantage of such a verbal placebo is that the doctor, from repetition, may come to believe it himself.

1. Joll, C. A. *West Lond. Med. J.* October, 1940, p. 58.

QUICK CURES FOR A COLD

THE common cold is still easier to catch than to cure, and the public is right in reproaching the medical profession for not turning the full powers of controlled experiment on the search for a way of preventing it or cutting it short; not that the public can claim to have given a fair trial to the measures whose efficacy has been proved. What the patient wants is a quick recovery with no complications, but though every doctor and nearly every layman has his pet treatment there is still truth in the cynical saw that it takes a week to cure a cold but it cures itself in seven days. Most doctors would agree that the best treatment for an incipient cold is complete rest in bed for a day or two days, thereby saving the patient a week of misery, and, more important, preventing dissemination of the infection to others. Bed, blankets and brandy is an ancient cure, and if the brandy is not now available a sweating powder like Dover's or aspirin, with a hot drink, may take its place. A saline purge will help. The room must be warm but well ventilated, and both hands and feet should be kept warm with bed-socks or mits, for LEONARD HILL demonstrated years ago that cold feet and a stuffy atmosphere produce nasal turgescence. If the patient cannot or will not go to bed he should still try to keep his hands and feet warm—no easy task, for a cold seems to induce vasomotor instability in the skin. He has a choice of ambulatory treatments. Of the

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more highbrow, short-wave therapy to the nose has lately been advocated as a quick cure. Dr. J. P. P. STOCK has been using this form of treatment among the employees of a large factory, and in controlled tests has obtained encouraging results which are not yet extensive enough for publication.

Most of us have to rely on drugs or local applications. Quinine and the opium alkaloids have long enjoyed a reputation for cutting short attacks. In a careful investigation at the University of Minnesota, DIEHL [1] found that the most successful preparation was a mixture of codeine and papaverine, gr. ¼ of each in the morning and afternoon and gr. ¾ of each at bedtime. Of 216 students with incipient colds 75% reported improvement or recovery in 24–48 hours with this mixture, compared with 35% similarly improved by lactose pills; aspirin and large doses of sodium bicarbonate gave no better results than the lactose. So far the sulphonamide drugs have failed us in the treatment of uncomplicated colds, and their toxic effects, especially in ambulant patients, must be borne in mind. Vitamins have a wide popularity as prophylactics, though perhaps without statistical support, and massive doses have also been used in treatment—for example, a capsule of Dekadexolin (a concentrate of vitamins A and D) every hour during the first day of a cold, or an injection of 1 c.cm., repeated next day if required. Local applications mostly consist of an emollient base with the addition of menthol and essential oils, with or without ephedrine. However tempting it may be, acutely congested mucous membranes should not be repeatedly blanched by vasoconstrictors, for these may impede ciliary action and interfere with nature's bactericidal efforts. Later they may be useful to facilitate drainage from an infected sinus. Glegg's mixture, of which POULTON [2] was an advocate, can be used in both the early and late phases of a cold. This is the naristilla paraffini of the L.C.C. pharmacopœia and consists of white soft paraffin 1 part and liquid paraffin 3 parts. It must be dropped into the nostrils with a pipette while the patient lies on his back. Like many others this cure has its enthusiasts who claim that it is infallible, but at least it can be relied on to relieve the cold-headache which is often wrongly labelled sinusitis.

1. Diehl, H. S. *J. Amer. med. Ass.* 1933, **101**, 2042.

2. Poulton, E. P. *Lancet*, 1932, **1**, 933.

Annotations

THE A.M.A. AT BAY

Dr. Morris Fishbein, editor of the *Journal of the American Medical Association*, has been summoned for trial at the U.S. district court of Columbia on a charge of conspiring to violate section 3 of the Sherman Anti-Trust Act. Other defendants in the action are the secretary and general manager of the association, the secretary of the council of medical education and the director of its bureau of medical economics. They will all have to remain in Washington for many weeks and the keenest sympathy will be felt with them and the association which they serve for their enforced inactivity at the present time; for, as the J.A.M.A. points out in its announcement,[1] the association when requested to assist in the present national emergency voted unanimously to give whole-hearted coöperation and support. Its officers have since been engaged intensively in that service and in working to provide all the various arms of the government with the physicians they need. Plans have been laid to carry on the work of the association in order that the medical world and the public may not suffer.

It may be recalled that the indictment by the assistant attorney general, published more than two years ago, spoke of the American Medical Association, the only important society representing the medical profession in the United States, as having expressed a policy of opposition to group medical practice on a risk-sharing prepayment basis, without opening the columns of its journal to contrary views. The defendants, he said, had conspired together for the purpose of restraining the members of Group Health Association, Inc. from obtaining, by coöperative efforts, adequate medical care for themselves and their dependants from doctors engaged in group medical practice on a risk-sharing basis; and for the purpose of restraining certain Washington hospitals in the business of operating such hospitals.

Group Health Association, inaugurated in November, 1937, is composed of government employees working in Washington, for whom the Home Owners Loan Corporation arranged a system of health insurance. The District of Columbia Medical Society regarded aspects of the group association as illegal, and announced that it was working out a system of insurance of its own. Next the American Medical Association intervened, and brought pressure to bear on local hospitals to refuse admission to patients belonging to the group association. The controversy attained nation-wide importance, and if the essential issues come clearly before the grand jury in Washington they will be faced with a decision of vital interest to medicine not only in the U.S.A. bnt in the whole civilised world. The section of the Anti-Trust Act which the A.M.A. is said to have infringed prohibits "combinations which prevent others from competing for services as well as goods." There was at the outset a doubt whether it would be possible to obtain a conviction under this indictment because it would be necessary to prove that medicine is a trade rather than a profession and is involved in inter-state commerce.

The items in the platform of the American Medical Association which embody its present policy for the provision of medical services include:

The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.

The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.

The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.

In the extension of medical services to all the people, the utmost utilisation of qualified medical and hospital facilities already established.

The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.

Expansion of public-health and medical services consistent with the American system of democracy.

It would not be proper at this moment to say more.

1. *J. Amer. med. Ass.* 1940, **115**, 1366.

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EVACUATION PROBLEMS GETTING SOLVED

MANY of the school reports that are coming in throw light on the evacuation problem and demonstrate the capacity of the medical service to cope with all matters which lie within its province. Of the children evacuated from the London area to Northampton county Dr. C. M. Smith tells us that 10 per cent. were unclean. In the three years 1936–38 the uncleanliness percentage of the native children was 5·2, 6·1 and 5·7 respectively. The difference expressed in rates does not appear to be great but in practice it is formidable. Dr. Smith remarks that the fault is mainly carelessness, indifference or negligence, and in some few cases sheer incapacity, on the part of the parents. The school service soon learned that these four "causes" not only required different treatment but varied according to the level of cleanliness locally. Incapable parents may have been prevented by hard luck, severe poverty and the like from giving their children the attention they require, or their lack of mental ability may make them incapable in any circumstances. The incapable who have shown themselves hopeless should be obliged, Dr. Smith feels, to hand over their children to the state, for nothing short of that will give them an opportunity of reasonable upbringing. This is arguable, but it serves to show that the only obstruction which the school medical service cannot overcome is lack of mental capacity on the part of parents. It can see its way through all other difficulties if backed by a strong public conscience. Bedwetting came as a complete surprise to receptionists, but Dr. Smith soon found his way through this difficulty, as he did through those connected with contagious skin conditions. Repeated application to governmental departments and to evacuation authorities for extra help were in general fruitless, but metropolitan medical officers were helpful (he mentions Willesden and Walthamstow). He appreciated the arrangements made by the Central Midwives Board for drafting staff to the districts where it was required, but as the C.M.B. has nothing to do with the school service the appreciation is a covert rebuke to the Board of Education and Ministry of Health for not having done likewise. Dr. Smith insists that it would be entirely wrong if the impression were gained that the immigrant children had given rise to endless trouble and anxiety. They gave work, hard work, and in some cases work which was not expected, but (says he) a well-organised school medical service is not easily put out. Epidemiologists will learn with interest that the children from London suffered less than the native children from influenza, rubella and measles, which were highly prevalent in Northants during the spring of 1940.

PANTOTHENIC ACID AND ADRENAL LESIONS

NEW discoveries of the essential constituents of animal diets are made yearly, and it should soon be possible to feed animals completely on synthetic materials. Where yeast or wheat germ or their fractions used to be given as sources of the vitamin-B complex, it is now almost possible to substitute the individual substances of the complex. The synthesis of pantothenic acid, announced earlier in the year, is another step in this direction. The substance has been shown to be essential for the growth of rats, and to prevent dermatitis in chicks. As further essential substances are identified it becomes easier to study the symptoms produced by a deficiency of any one of them. Daft and his co-workers[1] have fed rats a diet consisting of casein, cod-liver oil, Wesson oil (as an additional source of fats) a salt mixture, and sucrose, with supplements of choline, thiamin chloride (aneurin B_1), riboflavin (B_2), pyridoxin hydrochloride (adermin B_6), and nicotinic acid (B_7). The absence of vitamin C is not relevant, since rats do not use this vitamin. More than half these rats developed epistaxis, ocular exudate, spectacled eyes, depilation and degeneration in the adrenal glands. Ashburn reports[2] that their adrenals showed congestion, hæmorrhage, atrophy, necrosis, fibrosis, hæmosiderin deposition and cortical fat depletion. The spleen and pancreas were healthy, but testicular function was abnormal and the upper epiphyseal cartilage showed hypoplasia.

The diet was deficient in only one fully identified essential factor—pantothenic acid. After 10 weeks on the diet the rats were divided into different groups. One group continued on the old menu; the others received, in addition, doses of pantothenic acid, ranging from 100–200 μg., for periods of 6–14 days. In all the treated rats, the symptoms disappeared entirely or decreased in severity, while the symptoms of those receiving no supplement were exacerbated. In the rats in all groups the adrenals showed congestion, fibrosis, scarring and hæmosiderin deposition; but in 10 out of 16 rats on the deficient diet the adrenals also showed hæmorrhage, atrophy, and necrosis; only 1 of the 28 rats in the other groups showed active lesions (and Ashburn suggests that this one was mislabelled). The fat content of the adrenals of the different groups varied strikingly: 14 of the 16 untreated animals showed considerable depletion in the fascicular zone; in the 28 treated animals this zone was normal in 6 and slightly depleted in 18 others; the remaining 4 showed moderate depletion in patchy areas. The functional state of the gland is thought to be related to its fat content, so that pantothenic acid may be concerned with the ability of the gland to produce cortical hormone. In this experiment the testes failed to recover normal appearance or function as a result of pantothenic acid, but in another experiment, where the supplement was given for 5 weeks, the testes at the end of treatment showed no abnormal cells and spermatozoa were numerous. Evidently function does improve but the change is gradual and takes some time to become demonstrable. In the treated animals, the tibial epiphyseal cartilages become hyperactive, and skeletal growth, which is slower than usual in the untreated animals, is accelerated. Daft and his co-workers attributed the pathological findings in rats on a diet deficient in pantothenic acid to adrenal cortical insufficiency.

MONKEY TRICKS IN THE NURSERY

NEARLY 50 years ago attention was first drawn to the curious ability of the newborn infant to suspend the weight of his body in mid-air by the strength of his own grip. Why this should happen is still not clear and speculation does not offer much of scientific value. But a study of the performance in the developing infant and the relationship of changes to the maturation of the central nervous system present some scope for the investigator. Myrtle B. McGraw,[3] working in the department of pediatrics of Columbia University and at the Babies' Hospital, New York, devised a standard method of observing the length of time that infants would remain suspended from a rod by both hands or by right hand or left hand alone. Measurements of this "suspension time" were obtained at intervals on a group of 91 children over several years. The total number of measurements for two-hand suspension was 3121, for right-hand suspension 2017 and for left-hand suspension 1827. It was found that starting from a relatively low level immediately after birth both single-hand and double-hand suspension reach a maximum at about the end of the first month. About the end of the third or fourth month single-hand suspension becomes almost extinct and suspension by both hands fluctuates about a low level. Then, somewhat surprisingly, this suspension

1. *Publ. Hlth Rep., Wash.* July 26, 1940, p. 1333.

2. *Ibid*, p. 1337.
3. *Amer. J. Dis. Child.* October, 1940, p. 799.

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phenomenon reappears and from the end of the first year in the case of two-handed suspension and somewhat later—even as late as the third year—in the case of single-hand suspension the measured time increases. There are, however, qualitative differences in the performance of older children which suggest that the later achievements are deliberate or voluntary. There is a difference in posture also in these older children. The infant hanging by both hands lets the head drop back towards the interscapular region and flexes the lower extremities on the abdomen. The older child tends to hold the head erect and extend the legs, until fatigue causes a reversion to the infantile position. The method of grasp also varies; the young infant localises his grip in the distal phalanges, leaving the thumb passively adducted on the palm; as the child grows older there is an increasing tendency for him to hold the rod in the palm of the hand with the thumb actively engaged in the grip. It is suggested that the suspension phenomenon in the newborn infant is controlled at a subcortical or lower level in the central nervous system. Indeed McGraw has observed the phenomenon in 3 anencephalic infants. The reduction in suspension-time after the first month suggests that the inhibiting influence of the cortex is beginning to assert itself and during the next 3 months cortical inhibition becomes completely dominant, so that suspension behaviour is either extinct or nearly so. The later re-establishment of the phenomenon suggests a large degree of voluntary coöperation. This is regarded as evidence of the maturation of those cortical cells which activate or control neuromuscular movements and fits in with other studies of neuromuscular development. Although McGraw's studies are solely concerned with the suspension phenomenon in normal infants, failure or delay in the appearance of the third phase, when ability to hang by the hands returns, might serve as a warning of serious mental defect.

CARDIOVASCULAR SYPHILIS

THE early diagnosis of syphilitic aortitis is as difficult as any in clinical medicine, and, as O'Farrell[1] says, involvement of the aorta is so constantly present in cardiovascular syphilis that other forms may be disregarded with few exceptions.[2] Most pathologists now agree that syphilitic involvement of the myocardium is exceedingly rare. Among recent attempts to make the diagnosis of early specific aortitis easier is that of Maynard,[3] who gives the following six criteria to look for: (1) a definite history of syphilitic infection; (2) the absence of any evidence of other disease that might dilate the aorta; (3) a patient aged 40 or less; (4) radiological evidence of dilatation of the aorta; (5) a hollow, accentuated aortic second sound; (6) a systolic murmur in the aortic area. O'Farrell rightly points out that the second of these criteria is often the most important, and the main difficulty here is the exclusion of the dilated, tortuous aorta of "arteriosclerosis." An enlarged left ventricle without aortic incompetence makes aortitis unlikely, but since an appreciable number of cases of specific aortitis are complicated by hypertension the final decision may not be easy. A valuable point which O'Farrell does not mention is the increased density of the aorta detectable on screening in many syphilitic cases. The late stage of aortitis—aneurysm of the aorta—is as a rule easier to diagnose, especially if radiology is employed in all cases of suspected heart disease or pain in the chest, though the time-honoured classification of aneurysms into those of signs and those of symptoms has now had a third category added to it—those with neither signs nor symptoms. O'Farrell suggests that aneurysm of the first part of the aorta is particularly difficult to diagnose, but actually these are the cases in which the aortic valve is most likely to be involved and it is usually not long before an aneurysm in this area shows itself by pulsation in the chest wall. A commoner difficulty lies in mistaking pulsation to the right of the upper part of the sternum due to aortic incompetence for an aneurysm. It is regrettable that O'Farrell supports the old teaching that it is possible to differentiate between the murmurs of rheumatic and syphilitic aortic incompetence by their site, the former being supposed to be maximal to the left of the sternum and the latter to the right. The relationship of syphilis to coronary disease deserves further investigation, especially in these days when doctors are becoming so coronary-conscious. In the past we may have been too apt to attribute symptoms and signs to syphilis, but so far as coronary disease is concerned we are now swinging too far in the opposite direction.

Consideration of cardiovascular syphilis leads to one certain conclusion—that prevention is easier than cure, and that the first essential is to treat every syphilitic efficiently at the time of primary infection. As a further precaution all people who have had such an infection should have their heart examined, clinically and radiologically, once or twice every year.

1. O'Farrell, P. T. *Irish J. med. Sci.* November, 1940, p. 731.
2. Burke, E. T. Venereal Diseases, London, 1940.
3. Maynard, E. P. *Brooklyn Hosp. J.* 1940, **2**, 69.

ENDOCRINES AND INVOLUTIONAL MELANCHOLIA

THAT endocrine therapy should fail to influence depression at the menopause has always seemed like a muffed conjuring trick. The state of the patient strongly suggests some degree of endocrine imbalance, and bearing this cardinal fact in mind R. E. Hemphill and Max Reiss have attacked[1] the problem again. The imbalance, they believe, is more likely to be complex than simple, so they have attempted to classify the types of endocrine abnormalities found in a series of 30 women admitted to hospital with depression associated with the menopause; only 4 of them had a history of previous attacks of depression.

They were grouped tentatively as follows: type 1, hypo-ovarian secretion (11 cases), patients with menstrual cessation or irregularity, fat deposition round the lower abdomen and thighs, and symptoms of flushing and giddiness; type 2, hypo-ovarian and hypothyroid secretion (4 cases), patients with menstrual irregularity, few somatic symptoms, dry skin, falling hair, and a small impalpable thyroid; type 3, hypo-ovarian and hyperthyroid secretion (7 cases), patients with menstrual irregularity, somatic symptoms, moist sweating skin, increased pulse-rate, full thyroid and in 2 cases exophthalmos; type 4, hypo-ovarian and hypo-adrenal secretion (8 cases), patients with acute loss of weight, sallow complexion, flabby muscles and skin and an impalpable thyroid. Patients of type 1 were depressed and quiet; patients of types 2 and 4 showed motor agitation; the type-3 patients reacted more acutely to changes in their environment than the others, and 4 of them were suspicious, almost paranoid. It may or may not be significant that 9 of the type-1 patients had never borne children. Gonadotrophic hormone is said to be increased in the urine of women after the menopause; in this series it was not a constant finding but was common in types 1 and 3. Since folliculin inhibits the production of gonadotrophic hormone, follicular hormone was given to 19 patients in the series in large doses, both by mouth and parenterally. Of 7 type-1 patients treated in this way, 3 made complete and 2 partial recoveries; the other 2, who had had symptoms for more than two years, showed no change. Of the 4 untreated patients in this group, 2 recovered and 2 showed no change. Type-2 and type-4 patients treated with follicular hormone were not improved. Of 5 type-3 patients treated 3 improved sufficiently to go out and the other 2 were symptom-free at the time of publication of the report;

1. *J. ment. Sci.* November, 1940, p. 1065.

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the 2 untreated patients in this group both showed slight spontaneous improvement. Hemphill and Reiss got the impression that follicular hormone tended to aggravate symptoms in patients in whom thyroid function was diminished (type 2). Luteal hormone had no effect on patients of any type. The only other success was with a type-4 patient who had shown no improvement for two years and who recovered dramatically after injections of the corticotrophic hormone of the anterior lobe of the pituitary; 2 other patients in the same group showed improvement on this treatment.

The series is too small to justify even the most tentative conclusions, and the recovery-rate among the controls was high enough to make the causes of success questionable in those cases which improved on treatment, but the value of the work lies in the scientific approach and the attempt to analyse the endocrine components of the condition.

Special Articles

IMMUNISATION AGAINST BACTERIAL TOXINS

Being an abstract of the second Harben lecture delivered at the Royal Institute of Public Health and Hygiene on Dec. 10 by Lieut.-Colonel H. J. BENSTED, M.C., M.R.C.S.

SOME diseases are dangerous because of the poisonous effect of bacterial toxins, and if the toxin is destroyed—at least in the case of tetanus and diphtheria—the bacteria rapidly disappear from the body. It may be possible, by using bacteriostatic agents, to limit the multiplication of the bacteria, but until the toxins have been neutralised the illness cannot be completely arrested. Some of these toxins have specific affinities for certain cells, and once they have reached these cells they become fixed; the toxin must be neutralised, therefore, before such fixation is possible. The tetanus toxin has an affinity for the anterior-horn cells which it reaches along the path of the nerves; once infection has been established and the toxin is being produced, there is always a race to neutralise it before it reaches those cells. Theoretically it should be possible to saturate the cells rapidly with a relatively harmless drug which would keep the toxin from gaining access to them long enough for the patient to immunise himself. This may partly explain the success of hypnotics in the treatment of tetanus, but their application as a form of treatment is limited.

The aim of immunisation in this group of diseases is to supply the body with enough antitoxin to make neutralisation possible at the earliest possible moment. This may be done by injecting relatively large amounts of antitoxin whenever there is an immediate risk of infection or by stimulating the body in advance to produce sufficient antitoxin of its own to neutralise the toxin as it is produced. If passive immunisation is to be effective the antitoxin must be given early and the dose must be repeated at intervals while the risk of infection persists. Any method which ensures the presence of basal antitoxin in the blood over long periods is to be preferred. The toxins of tetanus are readily modified by formalin, and toxoid made in this way may be injected into the body without harm and is highly antigenic.

TETANUS

There was little danger of tetanus in civil life when traffic accidents were rare, but it is one of the major horrors of wars, especially European wars. It is most common in wounds sustained on highly cultivated or manured ground. In the war of 1914–18, before specific prophylaxis had been introduced as a routine, the incidence of tetanus was about 9 per 1000 wounded. This was during a period of mobile warfare when there were often long delays before the wounded received full medical attention. Once administration of tetanus antitoxin to every wounded man became routine, the incidence fell to a little over 1 per 1000 wounded. One cause of this reduction, however, was the change from mobile to static warfare; there was less delay in taking the wounded to a medical post where antitoxin was available.

When Ramon reported his success in immunising the French army by means of anatoxin, Boyd, at the Royal Army Medical College, undertook an investigation in collaboration with the Wellcome physiological research laboratories which led to trial of the following preparations:—

1. Tetanus toxoid-antitoxin floccules prepared on the lines used for the production of diphtheria T.A.F. This gave a poor response and could not be recommended.

2. Tetanus toxoid (Ramon's anatoxin) prepared by exposing a highly potent tetanus toxin to the action of formalin at incubator temperature for 3–4 weeks. Given in two doses of 1 c.cm. each with an interval of six weeks between the injections, this produced a satisfactory response. The antitoxic titre ranged between 0·02 and 1·0 unit per c.cm. of the blood-serum tested, but remained at a fair level for long periods; the injection of a third dose 6–9 months after the second pushed up the titre rapidly. Reactions after the injections were negligible except for occasional anaphylactic phenomena after the second dose.

3. Alum-precipitated tetanus toxoid (A.P.T.), given in the same dosage and at the same interval as tetanus toxoid also gave satisfactory results but the titres were not much higher unless the interval between the doses was considerably extended. The material tends to produce induration at the site of the inoculation; the nodules are quite harmless and the slow absorption of toxoid from the indurated region may well be an important factor in the high immunising power.

Immunisation with two doses of plain toxoid with a six-weeks interval was introduced into the Army more than a year before this war began. When it broke out over 90% of the troops in the forward area were fully protected against tetanus. Injection was voluntary, so that 100% of inoculated men could not be expected; moreover, some of those inoculated may not have responded adequately. For these reasons all wounded men should be injected with a single dose of 3000 units of tetanus antitoxin, and those who have not been immunised should be given two subsequent doses of 3000 units of antitoxin with a week between.

The severe fighting before the Dunkirk evacuation provided a good test. Many men arrived in this country five or six days after being wounded without having received their initial dose of tetanus antitoxin. Amongst the small percentage who were unprotected by active immunisation, 8 cases of tetanus were reported, while among the large proportion who had been actively immunised not a single case of tetanus developed.

Most civil casualties are admitted to medical posts soon after being wounded, and can immediately receive their initial dose of 3000 units of tetanus antitoxin. The advisability of actively immunising members of civilian organisations who are especially exposed to risks has been fully considered by the authorities, and arrangements are being made for voluntary immunisation of those who wish it.

GAS GANGRENE

Gas gangrene is a clinical diagnosis, and the mere presence in a wound of *Clostridium welchii* or other members of this group of pathogenic spore-bearing anærobic bacteria does not necessarily mean that clinical signs are present. These do not develop unless the local conditions permit the bacteria to multiply and produce their toxins in increasing quantities. The toxins overcome local resistance and allow the bacteria to spread and to continue to produce toxins. The infection then becomes generalised and grave. In the later stages of the last war an antitoxin was introduced, but most workers found it unsatisfactory. Today the prophylaxis of gas gangrene depends on early surgical intervention and the use of sulphonamide drugs. Antitoxin is nowadays only used as an adjunct to surgery and chemotherapy. Active immunisation against gas gangrene has not advanced beyond the experimental stage.

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DIPHTHERIA

Diphtheria may appear as an infection of war wounds as well as in epidemic faucial form. In the last war many extra-faucial diphtheritic lesions were contracted during the dressing of wounds. There were also considerable numbers of so-called "desert sores" in the Near East, from which diphtheria bacilli were cultivated.

In 1935 during the North-West Frontier operations I investigated an epidemic of mixed faucial and extra-faucial lesions in a single regiment. The outbreak was protracted, and characterised by a high proportion of non-immunes (nearly 30% of the regiment) and a high carrier-rate amongst the immunes. Most of the cases occurred while the men were in hospital or barracks. Spread was limited by segregation, but it was not until immunity had been established by the administration of toxoid-antitoxin floccules that cases ceased to arise. Seven weeks from the first injection of the prophylactic all but 3% of the original non-immunes were Schick-negative.

The investigation demonstrated the ease with which diphtheria bacilli can be conveyed from an infected wound to a non-infected wound, either by direct cross-infection during dressing, or from wound discharges and mouth droplets drying on bed coverings and being disseminated later through the air.

The menace of direct infection in air-raid shelters is generally appreciated and the introduction of bunks may lessen the chance of a diphtheria carrier passing on the organism by direct projection of droplets. It is often forgotten, however, that the bacilli can remain viable in dried secretions, and may be disseminated when blankets are shaken in the air or dust on the floor is disturbed.

Dispersal of children from cities has done much to reduce the dangers of urban outbreaks of diphtheria, but city children generally include a larger proportion of immunes (either natural or immunised) than children in small country districts. Carriers among such children sent to live with families of non-immunes may originate an outbreak, and there is already evidence of diphtheria occurring in villages as a result of infection imported by child carriers from the town.

The immunity to diphtheria acquired from active immunisation is lasting—possibly for life. If it had been more widely practised during the last ten or fifteen years among children, especially those of preschool age, the danger of diphtheria would have been largely eliminated. To attempt now to immunise the high proportion of the non-immunes among young adults, whether in the Services or in the civil population, is a large undertaking. Any scheme for mass inoculation must first be applied to children of preschool age; the other age-groups can then be dealt with in an ascending order.

The two prophylactic agents commonly employed in this country are toxoid-antitoxin floccules (T.A.F.) and alum-precipitated toxoid (A.P.T.) Both these preparations depend primarily on the detoxication of a potent toxin by the action of formalin. A.P.T. is the more active and is the agent of choice for young children; reactions rarely follow its use in this age-group. It is usual to give 0·1 c.cm. intramuscularly as the first dose; if there is an excessive local reaction the second dose should consist of 1 c.cm. of T.A.F. after about three weeks. If the reaction is trivial the second dose should consist of 0·5 c.cm. of A.P.T. after an interval of a month. For the immunisation of older children and adults T.A.F. is to be recommended. It is only slightly less efficient as an immunising agent than A.P.T., and is the least likely of all prophylactics to cause reactions. It is usual to administer it in three doses of 1 c.cm. with four weeks between the first two doses and two weeks between the second and third.

Combined active and passive immunisation has an important place in dealing with non-immunes immediately exposed to the risk of infection. There is usually no time for Schick testing; antitoxin should be given together with A.P.T. or T.A.F. In this way the prepared antibody will protect the individual until the toxoid results in the production of sufficient antitoxin for basal immunity to be established.

ST. LOYES' TRAINING CENTRE

To make the best use of a crippled limb depends not only on the gravity of the crippling, but on the character of the injured person. Even an idle and dispirited patient can gain confidence and enthusiasm in the right surroundings, especially if he is in the company of others as luckless as himself, but more determined. Crippled boys and men coming to St. Loyes' training centre have a choice of several occupations suited to their inclinations and abilities. In the horology workshop about twenty or thirty students are learning watchmaking. Youths with gross physical disability may yet develop great dexterity in handling delicate tools. A beautifully made clock in the workroom is evidence of their skill, every part of it having been made by hand by the students themselves. The workshop is an economically effective unit; watches are sent to it for repair, checked in by the storekeeper (a boy with a flair for accounts and forms), fitted with any necessary new parts which are made by hand in the toolroom, cleaned when necessary, assembled, adjusted and sent out again.

Students with an ability to design are taught machine-drawing, and learn to design and make not only watch-parts, but tools and special modifications of the machine-room equipment. Mr. H. Kendall Towy, the instructor, finds that it is impossible to assess the capabilities of a student early in his training; he has many times despaired, but egged on by the chairman, Dame Georgiana Buller, has persevered with what looked like a hopeless case—to turn out a capable workman in the long run. Jobs are usually found for the fully trained workers, though St. Loyes' does not guarantee to place them. Only very occasionally does a St. Loyes' worker prove unsuitable for the job found for him, and then he generally settles down well in a different place. The great advantage of watchmaking as a trade is that the demand is always there, and that a free-lance worker can do the job sitting at the kitchen table in his own home.

Students with no mechanical bent are trained in cookery, domestic work, catering, gardening, the duties of a handyman or clerical training. The training centre consists of two large houses set in fine gardens and fields. The kitchens and houses offer scope for domestic training and the office work gives opportunity for clerical training. In the garden students learn not only the general care of lawns, flower beds and kitchen gardens, but the management of greenhouses and frames; they study drainage, soils, rotation of crops and the discomfiture of common pests.

There are dormitories and recreation rooms in both houses and in one a small stage for concerts. Out of doors a cricket field is no mere ornament in this cripples' home. They play keenly and arrange matches with other institutions.

The centre also offers a rehabilitation course for workers disabled by accident. This is conducted by a trained occupational therapist and is well equipped with looms, and material for handicrafts. The instructor finds that in order to get a given group of muscles working properly she often has to modify her equipment to suit the case. At one loom she had harnessed the injured man's feet to the treadles by light straps and cords, so that he was forced to bend his knee at each change; at another loom she had hung a sling from the top of the frame so that the patient had to perform all his finger and forearm movements with his arm above shoulder level. Her ingenuity is constantly being tested, and this is proof, if any is needed, that occupational therapy must be managed by a trained and experienced worker, and is a curative process not to be confused with jig-saw puzzles and a little wool-work to pass the time.

On the designation of the Most Reverend J. C. McQuaid to the Archbishopric of Dublin the president and fellows of the Royal College of Physicians of Ireland have presented him with a medieval gold ring with a large amethyst. It is of the type known as a Borgia ring, and came into the custody of the college a few years ago from the collection of the late Sir F. Conway Dwyer. Dr. McQuaid was for many years president of Blackrock, and many of his pupils have become licentiates of the royal college. He has close family connexions with the medical profession, for his great-grandfather, grandfather and father were doctors.

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Public Health

From the Annual Reports

IN the course of our notices of the 1939 reports we shall have many occasions to record levels of health never before attained, and, though 1939 was undeniably an exceptionally healthy year in all parts of the world for which reliable statistics are available, we must credit the health services with having brought this about. Naturally healthy years have been frequent in past times and each as it came along gave us new low levels of death and disease, each in its turn surpassing those which had gone before. The health services of Britain reached their acme in 1938 and after the crises of September of that year they declined somewhat rapidly; so as regards the services themselves 1939 was a very unfavourable year. This would not affect the health of that year to any great extent, but must be expected to do so in 1940 and subsequent years of warfare. It will be remarkable if the record of 1939 is broken until at least three years after peace has been restored.

Dr. Stephen Rowland, of *Northampton*, reports that 1939 was the second year in succession without a maternal death. This together with the satisfactory death-rate of 11·6, reduced by the comparability factor to 11·2, a low infantile mortality of 41·7, a record mortality from tuberculosis of 0·44 per 1000 population, and a very low zymotic death-rate "would seem to be substantial grounds for believing that the sanitary circumstances of Northampton remain satisfactory." The population of Northampton in mid-1939 was estimated to be 96,546; the number of births was 1190 and of deaths 1155. The births in 1938 were 1203. The absence of maternal mortality in 2393 consecutive births is certainly as encouraging as it is exceptional. Another unusual but unfavourable item in the vital statistics is that 29 deaths were uncertified. In September, Northampton received 16,944 persons evacuated from the London area, chiefly from Willesden, but by the end of the year all but 6717 had returned home. Amongst the specials were 286 blind persons, but of these only 108 remained in Northampton by February, 1940. Not much has been said of the special difficulties experienced by reception areas in accommodating blind persons, but various medical officers have found the blind contingent a very serious problem. Dr. Rowland says little about the blind he received apart from recording that nearly two-thirds of them returned home long before the battle of London started. He does, however, refer to the difficulty he had in billeting expectant mothers before and after confinement, "especially when one considers the large proportion of these immigrants who were of a class not frequently seen in Northampton." Most of the mothers went straight back to London as soon as they had got over their confinements, so easing a position which threatened to be "impossible." In this matter Northampton was in no different case from other areas receiving this priority class of evacuants, and probably there, as elsewhere (though Dr. Rowland does not say so expressly), the local residents were suspicious that some of the expectant mothers they were asked to billet were of doubtful virtue and still more doubtful freedom from venereal disease. There were a number of such undesirables in every contingent and the receiving authorities were rarely in a position to assure a receiving householder that the woman they desired to billet upon her was not of this class. This seems to have been the chief difficulty and it might have been foreseen.

In *Salford* the death-rate was 14·3, an increase of 0·5 on the rate for 1938, and the birth-rate fell by 0·9 to 14·9. The infantile mortality dropped to a new level of 69. Dr. H. Osborne suggests that the uncertain conditions prevailing since the crisis of 1938 may have adversely affected prospective parenthood, and that the absence of measles in 1939 may in part account for the record infantile mortality. In September, 1939, there was an evacuation to Blackpool of 406 expectant and nursing mothers and 269 children which might have influenced both the birth and infantile-mortality rates. Dr. Osborne's report is unusually full for one of 1939, which suggests that it was prepared before the receipt of the circular of the Minister of Health calling for reports cut down to the minimum, and it is therefore unusually interesting. At the census of 1931 the population of Salford was 223,438 but by mid-1939 it had sunk to 196,600, which left it with a density of 37·8 persons per acre. The death table for 1939, which is not exceptional for Salford, shows that of 2703 deaths registered 1265 occurred in persons over sixty-five. Of these, 179 were due to cancer—half of the total cancer fatality—but only 52 were due to pneumonia, that being little more than a quarter of the total fatality of this disease (201). Of persons between forty-five and sixty-five 789 died; this is a high proportion, containing 149 deaths from cancer, 319 from cardiovascular diseases, 68 from tuberculosis, 50 from pneumonia, and 52 from bronchitis. The age-period twenty-five to forty-five gave 284 deaths, also a somewhat high number. Of these, 77 were due to tuberculosis and 22 to pneumonia. Of the 202 deaths of infants under one year 58 were due to pneumonia. So a quarter of all infant deaths were due to pneumonia and a quarter of all pneumonia deaths occurred in infants of less than a year. Since 1915 the highest number of births in any one year was 6441 in 1920 and the lowest 2925 in 1939, the reduction having been almost regular for nineteen years. Since 1878 the five-year average birth-rate fell continuously from 41·5 to 15 0, the greatest drop being from 22·3 in 1918–22 to 18·9 in 1923–27. The death-rate was fairly constant at about 25 6 until 1892; it then fell fairly regularly to 13·6 in 1927, since when it has tended to increase slightly. In sixty years the death-rate from zymotic diseases fell from 5·4 to 0 4; that from phthisis from 2·7 to 1·0; that from nervous diseases from 3 5 to 0 9, and that from bronchitis from 3 6to 0·9. The cancer-rate increased from 0 5 to 1·7, and the heart-disease rate from 1·1 to 2 8. The pneumonia-rate fell from 1·8 to 1·1 but all the fall here took place since the last war. In the first year in which poliomyelitis was notified (1912) there were 29 cases, but since then the maximum number was 7 in 1915 and the average number about two per annum. Cerebrospinal fever, which also first appears on the notifiable list in 1912, averaged 6 cases per annum until 1933 when there were 13 notifications. The greatest incidence was 22 in 1936. Encephalitis lethargica first appears in 1919. In six years 26 cases were notified altogether but in 1923 the number jumped to 59. It declined to 27 in 1924, and then gradually disappeared. Since 1934 only 2 cases have been notified, one in 1935, the other in 1938.

Dr. Rutherford Cramb, of *Brighton* county borough, starts his report with a reference to the retirement of his illustrious predecessor, Dr. Duncan Forbes, in April 1939. The last three years have seen the passing from active service of many of the hygienists who built up the health services of the inter-war period. They did well, but we expect their successors to do better when they have the chance, so perhaps it will eventually prove to be an advantage that those who must reconstruct the services when peace comes were appointed during these troublesome times, when owing to unavoidable curtailments there is the chance of jettisoning functions which had become obsolete, or were of indifferent value. Brighton was a reception area in September 1939 and Dr. Cramb feared, as did most medical officers of reception areas, that the reception would adversely affect the vital statistics, especially infantile-mortality, maternal-mortality and infectious-disease rates. Actually these fears were unrealised. In Brighton the infantile mortality in 1939 was 45, the second lowest in its history, and the maternal mortality 3·2 against 3 0 in 1938. The low maternal mortality of evacuated mothers has been as striking as it was unexpected, and may be due to the comparative rarity of uterine inertia amongst them. In Brighton in 1939 there were only 36 notifications of puerperal sepsis in 2014 deliveries, against 68 in 1938. Dr. Cramb mentions his indebtedness to the Central Midwives Board, who, whenever requested to do so, sent highly trained and competent midwives to help with the increased pressure on the midwifery service. Without a doubt the Central Midwives Board, which before the war had no reputation for liveliness, rose to the war emergency with vigour and promptitude, which other central authorities did not. There were no deaths from measles, scarlet fever or enteric, only 4 from whooping-cough, 5 from diarrhœa (under two years of

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age) and 3 from diphtheria. Amongst 47 notifications of erysipelas there was only 1 fatality, in spite of 4 of the patients being under five and 10 over sixty-five years of age. The fall in fatality of erysipelas has been one of the most remarkable triumphs of medicine in the last few years and with confidence can be attributed to treatment with the sulphonamides, for until their advent the fatality had remained remarkably constant for as long as records are available. There were 5 notifications of poliomyelitis and 7 of cerebrospinal fever, of which 2 ended fatally.

The county borough of *Bootle* has a population only a third that of Salford but since its birth-rate in 1939 was 21·1 it contributed more than half as many new citizens. Its stillbirth-rate was 38·1 against Salford's 45·4, and its infant mortality 65 against 69. Since the last war the birth-rate was highest at 29·7 in the first quarter of 1920 and lowest at 20·1 in 1938. In Salford the rate for 1920 was 27·3 and its nadir 14·7 in 1934. This is a striking contrast, which may be explicable by difference in race with different attitudes towards contraception. Dr. F. T. H. Wood records that 31 or 3·5% of all deaths were uncertified. There are no slaughterhouses in Bootle, which is rather surprising even though Bootle is practically a suburb of Liverpool. Only 8 cases of puerperal pyrexia were notified, but since 5 of them died it is obvious that puerperal pyrexia is not notified in accordance with the requirements of the Public Health Act 1936. A fatality-rate of 60 is exceptionally high in puerperal septicæmia and impossible in puerperal pyrexia. There was no notification of cerebrospinal fever and only one of poliomyelitis. On the other hand diphtheria was highly prevalent, 326 cases being notified, which gives an incidence-rate of 4·53 per 1000 population. Its fatality was, however, only 5%, which gives a mortality-rate of 2·2 per 10,000, about double the rate for the country as a whole, but all the same nothing out of the common, for all districts have good and bad diphtheria years. The mortality from tuberculosis was 1·08, exactly half of what it was in the last decade of the nineteenth century. It is still high, for in the country as a whole the fall in the present century is from 2 01 to 0·63, but compares favourably with other towns in Northern England.

Infectious Disease in England and Wales

DURING THE WEEK ENDED NOV. 16, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1684; whooping-cough, 2032; diphtheria, 1408; enteric fever, 22; measles (excluding rubella), 13,114; pneumonia (primary or influenzal), 698; puerperal pyrexia, 128; cerebrospinal fever, 129; poliomyelitis, 22; polio-encephalitis, 5; encephalitis lethargica, 4; dysentery, 97; ophthalmia neonatorum, 72. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 22 was 1730, including: scarlet fever, 298; diphtheria, 272; measles, 589; whooping-cough, 46; enteritis, 44; chicken-pox, 179; erysipelas, 32; mumps, 22; poliomyelitis, 2; dysentery, 2; cerebrospinal fever, 25; puerperal sepsis, 6; enteric fevers, 13; german measles, 11; other diseases (non-infectious), 59; not yet diagnosed, 130.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 4 (0) from enteric fever, 1 (0) from scarlet fever, 10 (1) from whooping-cough, 20 (0) from measles, 52 (3) from diphtheria, 28 (3) from diarrhœa and enteritis under 2 years, and 33 (3) from influenza. The figures in parentheses are those for London itself.

Birkenhead reported 2 deaths from enteric fever, Greater London, Sunderland, and West Ham each 1. Fatal cases of diphtheria were scattered over twenty-one great towns, Liverpool reporting 13, Plymouth 5 and Cardiff 4. There were also 8 deaths from measles at Liverpool.

The number of stillbirths notified during the week was 185 (corresponding to a rate of 40 per thousand total births), including 14 in London.

The title of professor of physics as applied to medicine in the University of London has been conferred on Mr. W. V. Mayneord, D.Sc., in respect of the post held by him at the Royal Cancer Hospital (Free).

In England Now

A Running Commentary by Peripatetic Correspondents

IN 1932 I described my "Doctor's Day" as a consulting physician, which often extended from 9 A.M. to midnight and sometimes later—a fifteen or sixteen hour day with a maximum of three hours for rest and refreshment. The picture I drew looks highly coloured now, but it was a fair composite one of average days. The physician's time was divided between his private practice and his hospital work. I pointed out how the proportion which his honorary contributions got depended on the elasticity of his conscience; how one man boasted of his generosity if he gave up four hours a week, while another willingly gave the sick poor four times as much time, and allowed nothing except illness or extreme inconvenience to keep him from the hospital. How one man by invariable absence from committee meetings avoided the time-consuming incubus of officialdom, while another through punctilious attendance was rewarded by a place on every subcommittee elected to report on the thousand and one odds and ends referred from the lay board. I represented myself as striking the happy mean between ultra-conscientiousness and shabby disloyalty. Lectures to students or post-graduates; correction of examination papers; dinners, with the inevitable speech if a reputation had to be acquired; meetings of medical societies, with the presentation of a paper or at least participation in the discussion; material to be extracted for an article or a textbook; current journals to be skimmed or studied, for the teacher had to be, or appear to be, omniscient; private practice at home, consultations at a distance; and unlimited correspondence. What a life! And yet there was room for enough exercise to keep physically fit, and for enough social intercourse and recreation to avoid priggishness and narrowness of outlook. Only these had to be regarded as details which filled in unexpected gaps.

In those days I sometimes wondered what was the measure of private practice of a really busy consulting physician in the forefront of popularity. Sir Humphry Rolleston, in his Life of Sir Clifford Allbutt, describes how in 1892 Dr. Alex Hill, the master of Downing College, came on behalf of the medical faculty of Cambridge to invite Sir Andrew Clark, then president of the Royal College of Physicians, to accept the regius chair of physic. We read that "they talked it over for two hours, whilst some thirty patients waited for their morning appointments." Thirty patients! Many a consultant of my day would have read this casual observation wistfully or with envy. Enviously, in times of slackness or depression, as evidence of the popularity of his predecessor; wistfully, in times of stress, because that predecessor was able to work on such a basis. Those were the days when a glance at the tongue, palpation of the pulse, a formal application of the stethoscope, and a few words of unquestioned opinion and advice were accepted as a reasonable consultation. Contrast this with 1932: the preliminary anamnesis, the inspection and assessment of radiograms, electrocardiograms, pathological reports and the opinions of antecedent specialists and consultants; the physical examination, requiring the application of sundry instruments of precision which however automatic demand an irreducible minimum of time. Rarely did the interview end with the patient and his own doctor; more often it was continued by a number of relations labouring under the delusion that their presence was vital lest some crucial point in the history should be overlooked, and only too willing to spend the entire morning in what they considered a good cause. Even when these had been eliminated and verdict and sentence pronounced, it was not unusual for the patient's doctor, somewhat shamefacedly repudiating responsibility, to announce that his wife had requested that Dr. A should run the rule over him while he had this chance. Nor was it unknown for the doctor to bring up a daughter as well for an opinion, and he wanted to talk over a very interesting problem he had recently encountered, and to have a few minutes' gossip of the days when they were on the house together. One did very well if an

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allowance of three-quarters of an hour per patient was not substantially exceeded, and if six, or at the outside eight, patients were seen by working at extreme pressure throughout a long morning.

What of today? Anthony Trollope in his autobiography said "We all of us adapt ourselves to the circumstances around us. Though three parts of London were in flames, I should, no doubt, expect to have my dinner served to me if I lived in the quarter which was free from fire." It is, as he said, a matter of adjustment. We have little to do but it would be difficult to do much more. My day is nearly as long as it was in 1932, but I think myself lucky if I achieve five hours of honest application. Much of the remainder is sacrificed to transport difficulties and the embarrassments of alerts and the blackout. Our evenings are free. Dinner is consumed in peace with immunity from telephone interruptions, for even if people want to ring us up the authorities won't let them. We have no evening committees, society meetings, after-dinner speeches. There is nothing to entice us from our fireside. What do we do? Alas for those rash resolutions. With leisure in prospect we were to have written a novel, acquired a new language, or even learnt to play a musical instrument. We humbug ourselves with the excuse that it is impossible nowadays to concentrate. Yet in fifteen months I have read a big textbook on neurology, a still larger one on treatment, two moderate-sized ones on cardiology and one on pharmacology, as well as all the journals to which I have had access. I believe it would have been better to have applied myself to some earlier classics, and acquired a thorough grounding in the rudiments. All this I advance apologetically and in no spirit of boastfulness. My reading has been a salve to an hypertrophied conscience, a sort of mental anodyne, or if you will a form of addiction.

What of the future? We are assured by those entitled to speak with authority that the old conditions can never return. Perhaps, and perhaps not; prophecy is always hazardous. The capacity for recovery is inestimable, and although we old stagers will not have the courage, the vitality and the enthusiasm to continue the struggle or make another start, our juniors may again achieve the sort of professional life to which we were accustomed, with its vicissitudes, its disappointments and its prizes.

* * *

The brain has been likened to a master with many servants, some serving him ill, others well. Experience shows that the imperious master drives his servants too hard. Restless ambition and insatiable curiosity grow upon him as, with scientific developments, the panorama of life enlarges and its interests grow. The various serving systems and organs are mainly what heredity made them. Under the drive the weakest fall by the way. The ruthless tissue of the brain is finally the victim of the retainers it has abused. Arrogant to the last, the master sinks in sullen splendour into the abendland—the west. For the middle-aged and elderly the week-end habit would be a blessing if the time were spent in bed.

Paranoiacs and persons with obsessions commonly have morbid mental heredity. Watching them, one might conclude that their condition would exhaust them physically. But no; paradoxically, perhaps, they have "strong brains," good health, and commonly live a long time. On the other hand, people in whom no such inheritance can be found take on some strenuous mental task, develop impaired self-control, become irritable, unable to concentrate, show faulty judgment, sleep badly. They have "weak brains." To order the former to rusticate midst fowls, ducks and geese would be silly; the latter one might. Another way would be to give them real insomnia by divers means, keeping them in hospital for close watching—a fright-producing treatment, from which they might learn their cerebral limitations and thereafter live on a humbler mental level.

* * *

There have been many illustrious physicians whose lectures and bedside teaching were valuable, especially to senior students and postgraduates, but who were disappointing when the last stage, that of treatment and prescribing, was reached. Amongst these was Sir Samuel Wilks, than whom I consider no more distinguished physician has occupied the chair as president of the College of Physicians (1896). I have known him, when asked at the close of one of his original and fascinating bedside discourses what should be prescribed, to reply "I usually leave the prescribing to the 'ousepysician," or "sister, what would you prescribe?" He expressed the view that the best prescription for the Guy's Pharmacopœia would be the hospital park. In those days there really was one.

* * *

American students are not so numerous in England now. A few remain, however, and make their contribution to life in the blitzkrieg. Their quaint phraseology and self-confidence are as characteristic of the New World as the Englishman's Norfolk jacket and protruding teeth are symbolic of the Old. In a tutorial class in pharmacology the other day, I asked an American to distinguish between a vermicide and a vermifuge. The definition of a vermicide offered no difficulty, but he faltered over vermifuge. Finally, mobilising all his histrionic resources while his colleagues listened with growing amusement, he said emphatically: "Well, when the worm spots the anthelmintic coming through the pylorus, I guess it just beats it to the rectum."

* * *

Conservatism isn't just a political creed in England. I believe it's bred in the bones. The other day I was visiting a model shoe factory set up by a Czecho-Slovak firm. It has an excellent paternalistic welfare system, and has built good houses near the works—semi-detached—which it rents to the working people for 10*s*. a week. The first houses built were very modern, of continental design with flat roofs, but the workers disliked them so much that in the end the management had to give way and build typical English working-class houses with slanting roofs, and these have been enormously popular. What difficulties our post-war planners will have to face. Incidentally the factory offered free inoculation to the workers against typhoid and diphtheria, but only 7% took advantage of the offer.

* * *

In this ancient Scottish university we have our college club. Its members are drawn exclusively from the teaching staff, and in no circumstances are undergraduates allowed in the rooms. The club fosters closer relationships between the members of the different faculties. There appears to be a positive chemotaxis between the mathematicians and the medicals. The lowest common denominator is to be found among the geologists: they are welcomed by every group. The chemists, on the other hand, seem to be self-sufficient; for most of us it is a relief to escape for a time from the medical outlook and see the world through the eyes of a musician, a naval architect or perhaps a specialist in Arabic. Sitting near me at luncheon the other day there was a strong contingent from the divinity school, including a brace of ex-moderators. The conversation veered round to continental holidays. Biblical Criticism was recalling the pleasures of walking tours abroad; he had "done" a good deal of Germany in this way, and he said he looked forward to invading the other end of the axis some day. "Walking in Italy will be strenuous," commented Christian Ethics. "A car or at least a motor-bicycle would be helpful." "To lock up my car in its garage is the indispensable preliminary to an enjoyable holiday," observed Biblical Criticism somewhat pontifically. "If that's the kind of car you have," commented Semitic Languages, smiling, "you would certainly need fluent Italian or you must be able to undertake your own running repairs." "Unhappily," returned Biblical Criticism, looking at his colleague over the top of his steel spectacles, "I am an indifferent motor mechanic, and I cannot claim to be proficient in conversational Italian; but as Mussolini made the study of Latin compulsory in Italy a few years ago, I think I might make myself understood. . . ." "Yes," agreed one of the ex-moderators, "but you would soon be in difficulties if you were to depend on Latin when purchasing motor accessories. For instance, what is the Latin for a valve?" He looked round inquiringly at his colleagues, but there was no response. Fortunately, I was not invited to supply the information. I reflected, however, that it would be awkward to ask for a valve and be given a folding door.

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Parliament

QUESTION TIME

Vitamin Potency of White Flour

Mr. R. DE LA BÈRE asked the Parliamentary Secretary to the Ministry of Food whether, in respect of an American process for retaining the wheat germ and oil in the milling of white flour, he had examined this plan in detail; and if so, would he give the reason or reasons for it being turned down in favour of synthetic vitamin.—Major LLOYD GEORGE replied: The Ministry has obtained authoritative reports regarding flour made by an American process but they do not bear out the claims made for the flour in the matter of germ-content and keeping qualities. His attention has recently been drawn to somewhat similar claims and on behalf of a Canadian process for producing white flour described as of high-vitamin potency and he has arranged to have these claims fully tested.

Supply of Milk

Mr. ROBERT MORGAN asked Major Lloyd George to what extent the existing shortage of milk was partly due to abuses under the free and cheap milk schemes; what reports he had received on the subject, and whether he was aware that persons earning £10 a week, or more, were obtaining milk at half-price.—Major LLOYD GEORGE replied: The existing shortage of liquid milk is the result of a material fall in production occasioned by climatic conditions and reduced supplies of concentrates accompanied by a substantial increase in consumption which is attributable to air-raid conditions, the demands of the Services, the shortage of condensed milk and the introduction of the national milk scheme. As regards the second part of the question the national milk scheme provides for the supply of milk at 2*d.* per pint for expectant and nursing mothers and for children under five years of age without regard to means.

Mr. DAVID ADAMS asked if he was aware that national dried milk was cow's without either added vitamin D or iron salts; that it was now established that for infants up to one year dried milk with added vitamin D was superior to national dried milk alone and that for children above that age vitamin D and iron salts should be added, and that these two grades of milk powder were being supplied by manufacturers to local authorities; and whether, in view of the increased cost and the difficulty in procuring cod-liver oil, source of vitamin D, steps would be taken to supply national dried milk with the additions mentioned.—Major LLOYD GEORGE replied: National dried milk is ordinary milk in powdered form and contains no added ingredients. It is supplied as a substitute for liquid milk for consumption by infants under one year in cases where a doctor certifies that such substitution is desirable. The purpose of the national milk scheme is to provide milk, either liquid or dried, and not composite foods. These are already provided by local authorities for children who need special feeding.

Mr. ADAMS: Is he aware that dried milk has risen in price since Nov. 18 from 1*s.* 6*d.* per packet, equalling seven pints of cow's milk, to 2*s.* 6*d.* per packet; and what steps are being taken to restore this food to a reasonable figure.—Major LLOYD GEORGE: In order to meet the increased costs of producing milk it has been necessary to raise the price of milk for manufacturing purposes to 1*s.* 7*d.* per gallon. The cost of milk required for manufacturing a packet of dried milk prepared from 7 pints of raw milk would therefore be 1*s.* 5*d.* The price of 1*s.* 6*d.* per packet must therefore have been in respect of dried milk manufactured from raw milk before the manufacturing price was raised to its present level.

Heating of Air-raid Shelters

In answer to a question Mr. H. MORRISON, the Home Secretary, stated: I have made arrangements to provide as soon as practicable coal-stoves of a special type or other forms of heating in certain brick surface shelters and trenches which are used for sleeping purposes, in accordance with the recommendations of the Horder Committee. Those recommendations however related to shelters used for sleeping purposes and I do not consider that there is any sufficient justification for heating shelters not so used.

N.H.I. Benefits

Mr. ELLIS SMITH asked the Minister of Health if he had now considered the question of increasing all benefits paid under the National Health Insurance Act; and could he make a statement as to when they were to be increased, and by what amounts.—Miss F. HORSBRUGH replied: The question is being fully explored. It would not, in any case, be possible to introduce before Christmas the legislation which would be necessary to give effect to any decision to increase National Health Insurance benefits.

Medical Welfare Work in Africa

Mr. GEORGE HALL, under-secretary for the Colonies, informed Mr. Creech Jones that financial provision would be made for the construction of African housing at a cost of £31,000; African hospitals and dispensaries costing £10,000; and loans to local authorities, principally for African housing, £50,000. It was proposed also to provide in the 1941 estimates the sum of £5000 for medical welfare work in the Copperbelt in addition to the sum of £9500 already being expended there by the mining companies, Government and the Mines Canteen Fund. The medical services in Kenya had been and would be maintained to the fullest extent possible under war conditions.

R.A.M.C. and Physiotherapy

Sir FRANCIS FREMANTLE asked the Secretary of State for War what arrangements for physiotherapy had been made by the Army Medical Service; and whether advantage had been taken of the services of persons in civil life with expert experience of the subject.—Mr. A. EDEN replied: There are physiotherapy departments in all the more important military hospitals and convalescent depots, to which suitable equipment is supplied in the case of all establishments requiring such equipment. In addition, such departments exist in certain of the emergency medical service hospitals of the Ministry of Health, which are available for the accommodation of military patients who are in need of such treatment. A consultant in physical medicine to the Army and specialists in Army commands have been appointed. Their duties are to advise and supervise the treatment of patients in military hospitals and convalescent depots, and to train Army Physical Training Corps instructors in medical measures. The consultants and specialists were selected on account of their experience in physical medicine in civil life.

Dental Surgeons as Anæsthetists

Mr. GROVES asked the Minister of Health whether he was aware that the Royal Alexandra Hospital for Sick Children, Brighton, and the Royal Sussex County Hospital, Brighton, had appointed dental surgeons as anæsthetists for casualties although medical men were available; whether he would investigate the matter and take steps to terminate the present appointments and appoint only anæsthetists holding medical qualifications.—Mr. MACDONALD replied: No, Sir. I am informed that both these hospitals have arranged for a number of local dental surgeons to receive a special course of training in anæsthetics with a view to acting as anæsthetists in an emergency if medical men were not available, and I may add that several of these gentlemen gave valuable service as anæsthetists at the Royal Sussex County Hospital during the heavy pressure of work on service casualties immediately following the evacuation from Dunkirk. Such arrangements are within the discretion of the hospitals concerned. As the employment of dental surgeons without medical qualifications to act as anæsthetists at both these hospitals is limited to the circumstances indicated I am not prepared to take any action.

Medical Practitioners and Air-raid Damage

Mr. SORENSEN asked whether the Minister was aware that a medical practitioner who lost his home, surgery, and equipment through enemy action, and was therefore unable to continue his practice, secured alternative accommodation with difficulty near to his previous surgery, but had been threatened by the landlord with legal action to prevent his use of the premises, including the shop, as a surgery or consulting-room; and whether he would take steps to safeguard and assist all such medical practitioners in this respect and thus enable them to pursue their practice.—Miss F. HORSBRUGH, parliamentary secretary to the Ministry of Health, replied: The Minister is having inquiries made.

Transfer of Panel Patients

Mr. GROVES asked whether a panel patient whose doctor had been called up for service might forthwith transfer to any remaining doctor whom he might choose or only to the lists of those who had joined the protection of practices scheme.—

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Mr. MACDONALD replied: Where the protection-of-practices scheme concerned is on a voluntary basis, the right to transfer after giving due notice is not affected, but immediate transfer can only be made to the list of a participating practitioner. Where however the arrangements have been made by amendment of the insurance committee's allocation and distribution schemes, immediate transfer can be made to the list of any practitioner who is willing to accept the insured person seeking transfer.

Soldier's Death in Isolation Hospital

Sir ADAM MAITLAND asked the Secretary of State for War if inquiries had been made into the circumstances of the death of Signalman Peter Gunston at Towyn Isolation Hospital on Oct. 26; and if such inquiries had revealed neglect or lack of proper medical attention.—Mr. EDEN replied: I have received a full report on this case, and it reveals no neglect or lack of proper medical attention. I should like to take this opportunity of expressing sympathy with the soldier's father and mother.

Ministry of Health Circulars

Miss CAZALET asked how many circulars the Ministry of Health had issued to local authorities since Sept. 3, 1939.—Miss HORSBRUGH replied that the number was 392.

Evacuation of Tuberculous Persons

Dr. E. SUMMERSKILL asked the Minister of Health whether he was considering any scheme for the evacuation to suitable hostels of those tuberculous persons who refused sanatorium treatment but who were a source of infection in an air-raid shelter.—Miss HORSBRUGH replied: The Minister has this question under active consideration at the moment.

Obituary

CALEB WILLIAMS SALEEBY

M.D. EDIN., F.R.S.E.

Dr. C. W. Saleeby, eugenist, whose death on Dec. 9 at the age of 62 was reported in our last issue, owed much to his parentage. His father was founder and long head of the Mount Lebanon schools; his mother, who gave him his early education, was daughter of Dr. Caleb Williams of York, a pioneer alienist. He went to the Royal High School at Edinburgh and qualified M.B., Ch.B. Edin. in 1901 with high honours. He held resident posts at Edinburgh and York before coming south to assist Jonathan Hutchinson at the Polyclinic, after which he never left London until last year.

Lafayette

Saleeby is the Arabic for crusader and it was not for nothing that he regarded his patronymic as destiny. His Edinburgh life had already made him thoughtful about the origins of the shady side of human existence, and when he met Francis Galton his lifework crystallised. He became one of the moving spirits of the Sociological Society and waged ceaseless war upon what he called the diseases of darkness. The result of this preoccupation was already visible in an essay published in 1914 under the title Progress of Eugenics. In this essay he aimed at presenting the eugenic ideal in its pure form, disembarrassed of the extraneous and conflicting objects which tended to create prejudice. Advocacy of eugenics, he complained, had been made a pretext for the inculcation of class prejudice, had been used as an argument against love, as a reason for unjustifiable operations, as an excuse for the neglect of infancy, and as an outlet for loose talk about lethal chambers and stud farms. The essay was frankly propagandist and although on every subject touched it showed wide knowledge and enthusiasm it was marred by the complacency which all his life estranged the practising members of his own profession. Time will show whether he made any lasting contribution to the study of racial culture. It is without question that his amazing readiness in popular exposition, his impromptu use of striking examples drawn from common life as they came into his mind, made eugenic principles familiar to countless people who would not otherwise have heard of them. And this intellectual equipment was combined with an imposing presence and an ability to appeal to women on their own ground. He wrote incessantly in books, magazines and pamphlets, always in the same lucid and forcible manner which compelled attention. His connexion with the National Birthrate Commission of which he became chairman gave him access to the thoughts of others at a plastic stage. When the Medical Research Council published their first report on vitamins 20 years ago the conclusions they tentatively drew were already part of the currency of his teaching. He had himself wondered what it was in the diet of the bee that produced a few queens and a host of sterile females, he had thrilled at Lady Mellanby's study of the development of dental enamel in puppies, and he had seen the bearing of Stockard's experimental work on the association of stillbirths with maternal alcoholism. He questioned whether many of the diseases of the fœtus and newly born infant might not be due to defective feeding of the mother, he stimulated research upon the dietary of gravid mammals, and himself coined the phrase "racial poisoning," now in common use, for the action of such agents as lead, alcohol and syphilis on the embryo. It may be that his effectiveness suffered from dealing with causes rather than with people, from concentration on health without the daily contact in the flesh with the conditions that produce deviations from health. But in the last war Lord Rhondda had the sagacity to attach him to the Ministry of Food, and at the beginning of the present war when he retired to Tring he took over honorary consulting work in the minor ailments and antenatal clinics, and his colleagues there are able to speak of his complete devotion to the welfare of his fellow men.

FREDERICK WALLACE EDWARDS

SC.D. CAMB., F.R.S.

Dr. F. W. Edwards, who died unexpectedly after a short illness on Nov. 15 at the age of 52 was known to malariologists and medical entomologists in every part of the world as the embodiment of scholarship and the final arbiter in identifying mosquitoes. He was accurate and careful in all that he did and wrote; yet he found time to help everyone who was a genuine inquirer. In 1910, a year after his graduation, Edwards was appointed assistant in the entomological section of the department of zoology in the British Museum, and in 1937 he was promoted to be a deputy keeper of the department of entomology which had meanwhile been created. His charge included the crane-flies and the mosquitoes and was later extended to the whole of the nematocerous diptera and he was entrusted with the task of continuing F. V. Theobald's Catalogue of Mosquitoes, which Manson and Ross had shown to be an essential need of tropical medicine. His series of papers in the *Bulletin of Entomological Research* on the culicidæ led up to a general review in the last volume of African mosquitoes, soon to be published by the trustees of the British Museum. He was elected last year to the fellowship of the Royal Society.

LAMENT FOR CHOCOLATE.—Lord Woolton says that chocolate is a luxury, and has cut down the manufacturers' fresh milk, sugar and other raw materials. Meanwhile the demand has become greater than ever, and, rightly, the Services and munition workers have been allotted a generous share. Hinc illæ lacrimæ. No attempt seems to have been made to dilute the supply with inferior substitutes; certainly there is nothing ersatz about the sample which, according to their graceful custom, Messrs. Cadbury Bros. have sent us for Christmas. They claim with justice that chocolate and cocoa are concentrated and convenient foods, and for those who like figures they might add that milk chocolate has a calorie value three times that of boiled eggs, contains as much fat as cheddar cheese or fried gammon and nearly as much protein as egg-white, and is a good source of minerals and vitamin A. Good stuff.

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Letters to the Editor

CARBON-MONOXIDE POISONING

SIR,—Those of us who come in contact with the reality of carbon-monoxide poisoning are greatly indebted to Drs. McMichael and Ruskin for their comprehensive study in your issue of Nov. 30. The idea of open-air collapse, due to the absence of carbon dioxide in the fresh air, is particularly interesting. Some five years ago a very skilled chief officer of a large rescue station drew my attention to the frequency of collapse, especially in those cases in which artificial respiration had been performed, with oxygen as an adjunct. I accounted for the condition by a supply of CO_2 in the blood insufficient to stimulate the respiratory centre, bearing in mind that usually the period of rescue was prolonged, that during unconsciousness less CO_2 was made—especially with some of the blood-oxygen replaced by carbon monoxide—and that artificial respiration of pure oxygen washed out vital CO_2 from the air cells of the lungs and reduced its concentration in the blood. My informant has since used a mixture of 10 per cent. CO_2 and oxygen in poisonous atmospheres, and free CO_2 in ordinary air, and I have not recently heard of any collapse or relapse of serious nature. I doubt whether this open-air collapse will be generally accepted as due to the new atmosphere without CO_2. In my own experience amongst firemen, whose work naturally gives them mixed gases, I have not noted it except after exertion.

The typical symptoms, as related by the victim, are a buzzing or throbbing of the head, a giddiness or feeling of uselessness of the limbs, followed by some mental confusion which tends to argumentative excitement. If they rescue themselves and remain in the air, sensible enough to sit down and exaggerate their breathing, the effects soon pass away. Chief officers are warned to watch the period of excitement and to keep the breathing exaggerated in fresh air if necessary by free use of CO_2. By this means the carbon monoxide is readily eliminated, usually before collapse and unconsciousness. Reports from all over the kingdom convince me that the sooner breathing can be exaggerated in the fresh air the more perfect will be recovery.

The so-called delayed symptoms of carbon-monoxide poisoning are not due to the continued presence of the gas in the blood, but to the damage done to cell structure during the stage of anoxia. Artificial respiration is rarely necessary, and if it is performed without added CO_2 unconsciousness is unnecessarily prolonged. In fresh air oxygen is not essential, and the time wasted in procuring it may be the factor to determine life or death. The early—indeed the immediate—use of CO_2 is essential is all cases; almost every fire brigade in the land carries a small supply of it.

GILBERT BURNET,
Chief Surgeon, N.F.B.A.

Hemel Hempstead.

PNEUMOCOCCAL MENINGITIS

SIR,—Dr. Falla (*Lancet*, Nov. 30, p. 698) doubts the accuracy of Squadron Leader Coleman's figure of 35% for the present mortality-rate in pneumococcal meningitis. Dr. Falla suggests that the figure is probably too optimistic and that in fact the mortality is still "extremely high." I find that 10 cases of pneumococcal meningitis have been admitted to the Royal Hampshire County Hospital under my care since August, 1938, and 4 other cases of purulent meningitis, probably pneumococcal, from which the causal organism could not be recovered. In this admittedly small series there have been no deaths. All cases have been treated with sulphapyridine in ordinary doses and by repeated lumbar puncture. In the adult cases 2 g. of sulphapyridine was given, either by mouth or by injection, as the initial dose; this was repeated in four hours and then followed by 1 g. four-hourly. In 2 cases, after apparent control of the infection and a reduction in the drug, clinical relapse appeared which was readily subdued by increasing the dose to 2 g. again. The remaining cases all responded rapidly and went on to complete cure without interruption. The most dramatic case was that of a woman of 24, seven months pregnant, admitted to hospital semi-comatose after two days severe headache; her condition had been diagnosed as toxæmia. Her cerebrospinal fluid appeared as frank pus and was swarming with pneumococci. She was discharged cured in ten days and in due course gave birth to healthy twins. Others could no doubt tell similar stories and I wonder whether the suggested mortality-rate of 35% is not in fact considerably too high. The pneumococcus seems to me more easily destroyed by sulphapyridine in the meninges than in any other situation. Repeated removal of the purulent cerebrospinal fluid has seemed an important part of treatment, analogous to the removal of pus from the pleural cavity in pneumococcal empyema, where drainage is essential for cure even when sulphapyridine treatment has rendered the empyema sterile.

KENNETH ROBERTSON.

Winchester.

COMPULSORY IMMUNISATION

SIR,—Dr. Killick Millard's comments call for amplification of my letter of Nov. 16. Among other things I suggested compulsory active immunisation against diphtheria for all school-children—the term to be used not in a strict legal sense but to include all who are attending nursery and infant schools. There has been and will continue to be a growing exodus of the child population from crowded centres of population to reception areas and the chief danger of the spread of diphtheria will be in the schools. The only practical way of carrying out immunisation in a short time is by close coöperation with the education authorities in the school clinics where it is possible to combine medical supervision with the keeping of records. Immunisation on a voluntary basis would, of course, still be available for the remainder of the child population, but all authorities which have conscientiously undertaken diphtheria immunisation schemes will appreciate how difficult it is to deal quickly with this group. Reduction in the number of cases of diphtheria would help to solve our most immediate problems by allowing us to use the sparse isolation accommodation in reception areas to the best advantage. Judging from my own experience over a number of years, and from the remarkable successes reported by several medical officers of health in their own areas, the failure of voluntary schemes of immunisation, taking the country as a whole, is not due, as many would have us believe, to opposition from the parents, but rather to the failure of many public-health authorities properly to contact the people.

Dr. Millard emphasised his conviction born of long experience that compulsory measures would fail to achieve the desired result and cited as an example the intense opposition which resulted from the attempt in this country, years ago, to make small-pox vaccination really compulsory; but I would point out that the chief arguments elaborated at that time by a small but influential section of the community to bring vaccination into disrepute cannot be advanced with fairness where injections of diphtheria alum toxoid, T.A.B. vaccine and tetanus toxoid are concerned. As several weeks are required to develop the immune state after a course of injections it does not appear to me a wise policy to wait until the epidemic starts before widespread schemes of immunisation are attempted—which appears to be the official view at the moment. It is an unhappy thought that epidemics of infectious disease can decimate the population to an extent which does not appear possible even from the direct effects of the most severe aerial attack. I hope the medical profession generally will voice their disapproval of the present "wait and see" policy.

A. A. CUNNINGHAM.

Edgware, Middlesex.

BLOOD-UREA AND PLASMA CHLORIDE IN EXPERIMENTAL HÆMORRHAGE

SIR,—The rise of blood-urea after hæmorrhage is most likely due to the fall of blood-pressure and very probably has nothing to do with the hæmorrhage as such. We invariably found a rise in blood-urea after lowering the blood-pressure by various methods other than venesection. Blood-pressure aids the renal function—a fact not generally recognised—and a hypotonic condition impairs this function, in consequence of which urea accumulates in the blood. In regard to chlorides, we never succeeded in raising blood chlorides consistently, even after the

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administration of large quantities of sodium chloride. If salt is given in larger quantities than the kidney is able to excrete immediately, it goes to the tissues, returning to the blood later on, the blood chlorides remaining unchanged. The osmotic pressure must remain about the same under varying conditions. A substance which may disturb this equilibrium goes either to the tissues or replaces some other blood constituent. For this reason and others consistent results cannot be expected from any attempts to interfere with the blood chlorides.

Liverpool. I. HARRIS.

THE CASSEL HOSPITAL

SIR,—May I bring to your attention the fact that the Cassel Hospital has completed a war-time move to Ash Hall, Bucknall, Stoke-on-Trent. This move has been a difficult task at the present time but it has been carried out with no break in the continuity of treatment, as patients and staff were conveyed to their new home in one day. The situation of the hospital in Kent had for some time been an unfortunate one. After the loss of the Channel ports the invasion threats seemed very much on the doorstep, and the intensive bombing attacks on London and the South-East which developed later in the summer made matters more difficult. Everyone who listens to the B.B.C. bulletins is aware that Kent has received its full share of enemy attention. The effect of all these threats both real and potential upon the patients in the hospital was less than might have been expected. In the last annual report it was noted that the outbreak of war had produced very little overt disturbance upon neurotic and anxiety-ridden patients. This report was written before air-raids had begun in England, but the later impression was substantially the same. Most neurotic patients stood the strain of bombardment well. It must be stressed of course that one is speaking of patients whose illnesses were not caused by such traumata in the first place.

The atmosphere was not however a satisfactory one in which to carry out an intensive psychotherapeutic attack on neurotic symptoms, and the difficulty was increased by the anxiety felt by relatives and friends on behalf of the patients in Kent. Eventually it became evident that the hospital which normally draws patients from all parts of the British Isles was no longer fulfilling its proper function, in view of its geographical position, and the decision to evacuate was therefore reached.

It will fortunately be possible for the hospital to continue its work in a more central position and in a quieter atmosphere. Ash Hall, a converted country mansion about five miles from Stoke-on-Trent, stands nearly 800 feet above sea-level in its own grounds. Minor alterations have made possible the establishment of complete facilities for the treatment of patients, and the methods and scope of treatment will remain the same as at Swaylands.

E. FARQUHAR BUZZARD,
Christ Church, Oxford. Chairman of the Medical Committee.

THINGS TO COME

SIR,—Sir Francis Fremantle has now saved the situation. All that has to be done for the planning of future medicine is to alter the medical curriculum. Ignoring the small results of the last efforts to improve medical training let us be grateful for the knowledge that the study of anatomy and physiology particularly as regards "the processes of fatigue, exhaustion, abuse and decay . . . and defence from accident, &c." will be so important. So that, after the war, when the unemployed figures again soar into millions, when a new Geddes axe will cut down all social services, when further lowering of the standard of living and nutrition will occur, and when perhaps an unlearning people will still suffer further threats of war, we shall then be adequately equipped for all the corresponding medical problems. The scientific knowledge too will be valuable to determine the limits to which the standard of living of the working class can be depressed without spontaneous revolt arising.

But perhaps I am wrong. May it not be that fatigue, exhaustion and abuse are not social necessities? Perhaps a government for the people will order things better by then. A simple programme of minimum wage limits, maximum working hours, adequate housing, recreation and convalescent facilities, abolition of undernutrition, &c., might so alter the health of the nation as to require a new view of medical replanning. Perhaps too the people will demand attention to this problem with such a voice that even the political inertia of the "mass of the profession" will no longer matter.

Portland Place, W.1. HUGH GAINSBOROUGH.

SIR,—Many will be grateful for the lead in Mr. Aleck Bourne's letter in THE LANCET of Nov. 23. Through the persuasion of events numbers of our profession are being convinced that his idea of health is essential for family, social and national survival. He defines it "as a form of beauty and necessary for physical, moral and even spiritual exhilaration." There are medical men who feel that this new quality can be lived out—first in our own lives and in our homes, then in our patients, and so become convincing and available for the world. Our profession must itself be gripped by this conception of full health and how it is attained. Otherwise our aim will remain at the physical and mental level, compared with the physical alone as in the past when we treated mostly the end-results of disease and discord. Mr. Bourne points the need for adding the moral and spiritual to the physical and mental.

The medical world built in the midst of the present mighty upheaval must aim at this full or plenary health. Such health is peace and joy, the result of unselfish creative purpose for body, mind and spirit. This would be infectious health. Demonstration is not wanting that the diseased ego, or spirit, directed by dishonest, impure or selfish motives will produce subtotal health and can even wreck its own body and mind. In addition there is abundant evidence today that the sub-healthy ego will use its instructed mind and its developed body to destroy towns, ships and other persons.

Our profession with its unique advantages can learn the method and technique by which to restore or prevent the diseased ego and so attain this full health. Towards this objective can be the next great advance in medicine.

London. E. T. C. MILLIGAN.

TOO MUCH VENTILATION

SIR,—The views expressed by Dr. Copeland go back to Victorian days when tuberculosis was treated in shut-up warm rooms, sand-bags closed door and window crannies, and children of the well-to-do wore respirators out of doors in winter. The fear of night air arose from the ignorance of the cause of malaria as a mosquito-borne infection. Children catch cold on going back to school after the holidays because carriers bring infection into a non-immune herd crowded in shut-up rooms. It has nothing to do with damp beds, for we know that schools with children sleeping in the open air do not suffer from such infections at all. People isolated in damp cold climates such as Spitzbergen escape them until a ship brings in infection. Soldiers exposed in trenches in winter, and sailors on trawlers in the North Sea, escape them until they return on leave to hot crowded rooms. Patients having open-air treatment escape, while the nurses who shut themselves up in warm rooms suffer from such infections. In cold misty air there is very little water, and such air when warmed up in the respiratory tubes is far drier than the air of warm crowded rooms. The breathing of cold air stimulates the flow of blood through, and the secretion of mucus from the respiratory membrane; these are the natural defences against infection.

St. John Clinic, S.W.1. LEONARD HILL.

NICOTINIC ACID FOR BLISTERS ON THE LIP

SIR,—Nicotinic acid has been used in the treatment of various conditions of the skin and oral mucous membrane with such success that I was induced to try its effect in the following case.

A woman of 38 had her third pregnancy at the end of March 1940. Soon after she noticed a blister on her lower lip; this persisted for about a week and then burst, discharging a straw-coloured fluid. For the next four months she had a succession of these bullæ, generally three or four being present together.

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They were accompanied by severe itching and tenderness. She also complained of a swelling under the lip. The patient was sent to the Dundee Dental Hospital on Aug. 17 because it had been suggested that her blisters might have something to do with the teeth or gums. She seemed to be suffering much pain and confessed that she thought she had cancer. Five small blisters were seen in different stages of formation and resolution on her lip, but the swelling she complained of was not found. The gums were normal.

The history and appearance led me to think that the condition might be due to some vitamin deficiency, and I decided to try the effect of nicotinic acid.

On Aug. 20, the patient was given 250 mg. of nicotinic acid (150 mg. in the morning and 100 mg. in the evening) and these doses were repeated the following day. By the 22nd the lip was almost normal in appearance, there was no pain, and the sensations of itchiness and swelling had gone. She had been warned about the flush and itching which usually follows large doses of nicotinic acid. These lasted for about half-an-hour the first day and about a quarter-of-an-hour on the second, and a slight redness persisted for about a week on the left side of the nose. Daily doses of nicotinic acid were given—150 mg. for four days and 100 mg. for the subsequent four days. During the next three months the patient was observed at intervals; there has been no recurrence of the blistering and the lip has remained normal.

I went carefully into the patient's dietary, and found that it was the same as that of the rest of the household, and such as might be expected in a well-to-do and comfortable working-class family.

Dundee Dental Hospital. H. GORDON CAMPBELL.

Medical News

University of Oxford

At its meeting on Nov. 27 the board of the faculty of medicine decided that there should be an extra first B.M. examination beginning on Monday, March 17, 1941.

Royal College of Surgeons of England

At a meeting of the council of the college held on Dec. 12, with Mr. Hugh Lett, the president, in the chair, Mr. Robert Milne, Mr. V. Zachary Cope, Mr. C. E. Shattock, Lieut.-Colonel M. F. Nicholls, and Mr. E. W. Riches were admitted members of the court of examiners.

A resolution of thanks was passed for the gift of $7,500 from the Rockefeller Foundation for evacuating the library and research laboratories. A legacy of £1,800 from the late Sir Charles Tomes was reported.

A diploma of membership was granted to J. H. Hicks (Birmingham), and diplomas of fellowship to the following:—

S. F. Taylor, Oxfd and King's Coll.; J. G. C. Spencer, M.D. Camb., Lond. Hosp.; G. De Lacey, L.R.C.P., Lond. Hosp.; H. C. Fletcher-Jones, M.B. Lond., Westminster and Guy's; H. D. Johnson, M.B. Camb., St. Thomas's; C. Langmaid, M.B. Lond., Cardiff; J. A. Seymour-Jones, M.B. Camb., St. Thomas's; F. S. A. Doran, M.B. Camb., Manc. and Guy's; Eleanor M. Mills, M.B. Manc.; D. P. van Meurs, M.B. Lond., St. Thomas's and Lond. Hosps.; B. R. Billimoria, L.R.C.P., St. Bart.'s; G. Flavell, L.R.C.P., Otago and St. Bart.'s; H. C. Barry, L.R.C.P., Oxfd and Lond. Hosp.; W. G. Mills, M.B. Birm.; I. M. Jackson, M.B. Camb., Lond. Hosp.; A. F. Williams, M.B. Manc.; R. D. Bisset, M.B. N.Z., Otago and Guy's; Edith A. M. Whetnall, M.B. Lond., King's College; J. F. Bourdillon, B.M. Oxfd, St. Thos.; D. A. Arnott, M.B. N.Z., Otago; Abd el Salam El Barbary, M.B. Cairo, Lond. and Guy's Hosps.; F. W. Connaughton, M.B. Melb., St. Bart.'s; W. W. Gilford, B.M. Oxfd, Guy's; G. J. Hanly, M.B. N.U.I., Dubl.; C. B. Innes, M.B. N.Z., Otago; Roshdi Ismail, M.B. Cairo, St. Bart.'s; Harbans Lal, M.B. Punjab; C. T. Möller, M.B. W'trand, Guy's; L. I. Parton, M.B. N.Z., Otago; W. L. Phillips, M.B. W'trand; Rameshwar Prasad, M.B. Bombay, Guy's; and L. L. Samy, M.B. Cairo, Guy's.

The following diplomas were granted, jointly with the Royal College of Physicians:—

Diploma in anæsthetics—D. Aserman, W. Auld, A. J. W. Beard, H. M. Bird, Agnes C. Clark, R. M. Davies, F. C. Deller, O. P. Dinnick, Nancie I. Faux, W. J. Finnie, H. F. Harvey, D. Hewspear, T. H. Hughes, J. U. Human, H. Kopelman, J. L. Linacre, B. E. P. McCullough, H. C. Maclaren, T. T. P. Murphy, N. C. Porter, J. F. Rickards, J. D. Rochford, H. J. Shorvon, Margaret N. Smith, J. H. Taylor, A. Tindal, W. J. Walter and H. B. Wilson.

Diploma in laryngology and otology—L. S. Corner, J. B. Dowe, G. S. Irvine and K. H. Singh.

University of London

At recent examinations the following were successful:—

D.P.M.

With special knowledge of mental diseases (psychiatry).—W. E. W. Bridger, Matthew Radzan.

With special knowledge of mental deficiency.—Jaime de Bastarrechea.

University of Edinburgh

On Dec. 13 the following degrees and diploma were conferred:—

M.D.—*J. D. Allan, **G. J. Carr (in absentiâ), T. A. MacGibbon (in absentiâ), K. D. Salzmann (in absentiâ) and G. M. Thomson.

M.B., Ch.B.—W. G. Batters, A. L. Bell, Margaret H. Calder, Angus Campbell, W. C. Clark, J. M. Dawson, R. C. Dickson, Joseph Falk, Elizabeth Hainsworth, Abdel-Hamid Haseeb, J. L. Huggan, E. L. Knox, W. M. Latham, E. M. Leyland, G. B. Libbey, M. R. Liddell, P. J. Loots, Lucy M'Farlan, I. G. M'Gregor, J. F. M'Harg, Morrison M'Murrich, Alison M. Macquarrie, J. S. Main, James May, J. T. Millar, F. E. Milson, G. H. Murray, S. M. Musgrave, L. D. Philp, D. H. Pirie, W. V. Pole, Isobel J. Robertson, P. H. Scott, J. P. Sexton, R. L. Walsh, I. M. Wood and Arnold Young.

D.M.R.—Hassan Din, and Herman Hirschson.

* Commended for thesis. ** Highly commended for thesis.

University of Dublin

On Dec. 11 at the school of physic, Trinity College, the following degrees were conferred:—

M.A.O.—J. B. Fleming.

M.D.—P. A. McNally.

M.B., B.Ch., B.A.O.—Wilbur Badner, Olga Bloom, N. C. Brown, R. M. Halahan, J. T. Hanna, H. T. Hutchinson, E. G. W. Lynch, Yvonne O. Mallet, Harry Menter, Edna G. Merrick, J. G. P. Mullally, J. M. Slattery, N. M. Smith, B. E. R. Solomons, J. I. Stafford, Gilbert Tattersall and I. T. Wolpe.

National University of Ireland

At recent examinations at University College, Cork, the following were successful:—

FINAL EXAMINATION FOR M.B., B.CH., B.A.O.

R. F. O'Driscoll, R. B. O'Neill, William Cahill (with first-class honours); M. D. J. T. O'Riordan, Maire Henley, L. N. O'M. O'Ceallaigh (with second-class honours); Margaret M. Coakley, J. C. Delap, W. F. O'M. Doherty, D. A. Heffernan, John Hutch, T. F. Leonard, M. J. McSwiney, Edward Murphy, Dermott O'Driscoll, John Sheehan, R. J. Sheehan, H. B. Willington, J. A. Desmond and M. C. Duggan.

D.P.H.

Thomas Creedon, Mary Corbett, D. F. Murphy, and C. P. O'Connell.

D.P.M.

T. G. A. Carroll.

Army Casualties

The following casualties in the R.A.M.C. are announced:—

Prisoner of War.—Lieutenant G. M. Anderson, M.B.; A/Major J. D. Finlayson, M.B. Glasg.; Captain J. P. Fox, M.B.; and T/Major A. H. Weston, M.B. Edin.

Previously reported missing, believed prisoner of war, now reported prisoner of war.—Lieutenant J. W. S. Irwin, M.B. Belf.

The seventh list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £12,600.

Births, Marriages and Deaths

BIRTHS

BLACKDEN.—On Dec. 10, at Quetta, the wife of Major J. F. Blackden, I.R.A.M.C.—a daughter.

DARBISHIRE.—On Dec. 9, at Greenodd, near Ulverston, the wife of Dr. S. B. Darbishire—a son.

FABER.—On Dec. 9, at Aldershot, the wife of Lieutenant Graham Faber, R.A.M.C.—a daughter.

HARRISON.—On Dec. 10, at Downham Market, Norfolk, the wife of Dr. L. T. Harrison—a son.

HURFORD.—On Oct. 30, at Watford, the wife of Dr. J. V. Hurford—a daughter.

REDMOND.—On Dec. 9, the wife of Dr. Aidan Redmond—a daughter.

MARRIAGES

FRANKENBERG—SMITH.—On Dec. 10, in London, John Frankenberg, M.R.C.S., Flying Officer, R.A.F.V.R., to Nancy Smith, S.R.N.

DEATHS

BIRD.—On Dec. 15, at Bridgwater, George William Harvey Bird, M.B. Camb., aged 70.

BRENCHLEY.—On Dec. 6, at Bournemouth, Algernon Dutton Brenchley, M.D. Aberd., past-master of the Society of Apothecaries of London, aged 86.

BUNBURY.—On Dec. 12, Edwin Garrett Bunbury, M.R.C.S., of West Hill, Ottery St. Mary.

PELLY.—On Dec. 9, at Buckland Monachorum, Huntly Nevins Pelly, L.R.C.P.E., D.T.M., aged 75.

SCOTT.—On Dec. 13, at Liss, William Lochhead Scott, M.D. Lond.

SIMMONDS.—On Dec. 12, at Sidcup, William Allason Simmonds, M.R.C.S., Lieut.-Colonel I.M.S. retd., aged 90.

WILSON.—On Dec. 13, at Cookham, Hugh Cameron Wilson, M.D. Edin., F.R.C.S.

WOODS.—In December, 1940, in Australia, Charles William Tuthill Woods, M.D. Brux., M.R.C.S.

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Notes, Comments and Abstracts

THE EVILL DOCTOR

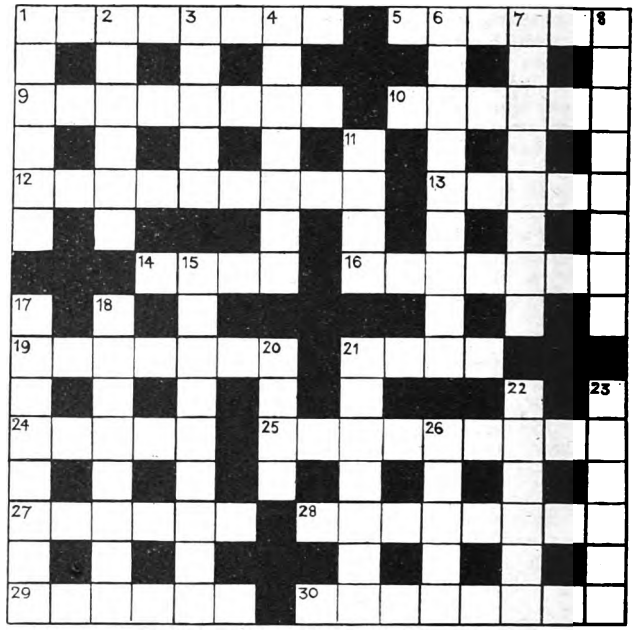
SCROFULA has been a good source of income to many a quack in its day, but it is possible that one or two of these unorthodox practitioners believed they had hit on a remedy. Mr. S. Wood, in the *Annals of Medical History* for September, gives an account of Mr. William Vickers, a clergyman, who may or may not have thought he was on to something good. At all events he was himself a victim of the king's evil, and he found a remedy which he afterwards claimed had cured him. As soon as this "anti-strumatick liquor" was incorporated in the blood "the scrofulous ulcers opened like so many floodgates, pouring out the humour with a mighty current." Mr. Vickers lived at the time of laudable pus, when nature was expected to accomplish the "decoction and despumation of morbifick matter." He began to treat the king's evil in 1706. Feeling that the great gift he had discovered must be applied to the common good he published a pamphlet on his specific. He seems to have given general satisfaction, for in 1709 his pamphlet went into a second edition, and this time he was able to announce 79 "extraordinary cures." After that it seems to have been plain sailing. Various clerical colleagues sent him patients and he cured the nephew of the surgeon-general in five months. He moved in the highest circles and was exceedingly huffy if remedies other than his were preferred by his friends. His specific was sent to patients living at a distance on the strength of a description of their symptoms. All this suggests that he was an honest man with a bee in his bonnet, but one or two facts about him put him in a less innocuous light. For one thing he was concerned to make as much money as possible out of his cure. "Claydon is one of the best stages I keep," he wrote to his kinsman by marriage, Lord Fermanagh, "twenty or thirty Guineys is the least I gett in an afternoon, my Packetts are so well approved. . . . Pray be sicke when I come into those parts that I may once more gett some of your Rino." He even went on a tour of the country to practise his art and enrich himself. But his relations, as so commonly happens, were not impressed. They called him the Evill Clergyman and the Prince of Darkness, and one of them, Sir Thomas Cave, was frankly sceptical. "I had this day with me one of Vickers's patients of a year's standing," he wrote to Lord Fermanagh, "whom he says he has done good to in her body but can't cure her face. Yet he sends her to be toucht, and I feare in a little time his honesty will be so well known that all his customers will come to the Queen." Well, Queen Anne at all events believed in her capacity to cure the evil, and was the last English monarch to enjoy that confidence. Mr. Vickers kept the secret of his remedy, and the only ingredient he mentions is spring water.

TRIPLE DYE LOTION FOR BURNS

Messrs. CROOKES LABORATORIES point out that in addition to their Tannic Acid Jelly (which itself contains the triple dye mixture incorporated with the tannic acid) they have had available for some time a triple dye lotion, under the name of Crystoflavine Burn Lotion, designed for the treatment of burns in cases where circumstances or personal preference make it undesirable to use tannic acid. This triple dye mixture, originated by Aldrich in 1933 (*New Engl. J. Med.* **208**, 299), consisting of brilliant green, gentian violet and acriflavine, was used with satisfactory experimental results confirmed by clinical experience. Thus Devine (*Med. J. Aust.* 1939, **1**, 14 and 924) treated 27 cases with this mixture and confirmed its superiority in resisting infection of the burnt area and also found the mixture to possess a distinct analgesic action.

Crystoflavine burn lotion is submitted as an alternative to tannic-acid treatment in burns of the second or third degree on the fingers where a rigid eschar may lead to constriction of the digital circulation. The lotion is dabbed or painted on the burn and allowed to dry. A second treatment is given after half an hour. Blisters should be snipped and dead skin removed. No dressing is applied.

LANCET CROSSWORD



ACROSS

1. You'll find the same in an heroic story making a mass attack (8).
5. (With 20 down) Syndactylism—but which digits? (Two words. 6, 4).
9. Most of the senators with scabies is certainly weird (8).
10. Royal Highlanders with poems are these far-fetched scholars (6).
12. Even a band can block the small one (9).
13. These stools upset the nursery (5).
14. A container for 28 in the plural (4).
16. This thins things out (7).
19. No butcher, but his joints are famous (7).
21. Where the verbalist scores. (4).
24. With a smaller saint this would be a defect of speech (5).
25. Ten aisles are needed here. (9).
27. "Their object is . . . to prevent the shattering effect of noise on the ——" (Official Description of Ear Plugs) (6).
28. Protective covering (8).
29. Though the Orient divides them, making them as empty froth, they still remain—wise? (6).
30. The man who is here can never be stumped—a gain on the whole (8).

DOWN

1. Ice is broken round the underground—a sickening affair (6).
2. To write—but it takes a good bit of editing (6).
3. It divides the Emergency Medical Service giving vent to—heat or light? (5).
4. There is much in this bone (7).
6. Automatic mimicry of words (9).
7. A deb. with roses is not quite the same as this affliction to the sufferer (Two words, 3, 5).
8. The factions follow Pluto (8).
11. A late and great neurologist (4).
15. Concerning a churlish fellow with a gape—all returning at intervals (9).
17. The Scot's accent leads the old French marechal to make a point for surgeons (8).
18. I eat crab—but my anagram will digest anything. (8).
20. See 5 across.
21. Not a woman in a ferment but a ferment in a woman (7).
22. Not the cause of card-room asthma (6).
23. Dad gets mixed with the sticky stuff and becomes a perfect pest (6).
26. Strong head wind (5).

The solution will appear in our next issue.

Appointments

BEBBINGTON, EVELYN, F., M.B. Lpool, D.P.H.: temp. asst. M.O. (maternity and child welfare) for Coventry.

HANSEN, E. T., M.R.C.S.; R.S.O. at Hansfield and District General Hospital.

LATTO, CONRAD, M.B. St. And., F.R.C.S.E.: R.S.O. at the Prince of Wales Hospital, Plymouth.

LUNN, J. G. T., M.B. Aberd.: R.M.O. at Salisbury General Infirmary.

MILLINGTON, ESMOND, M.R.C.S., D.M.R.E.: hon. radiologist to the Royal Alexandra Hospital for Sick Children, Brighton.

ROWLAND, Millicent, M.B. Lond.: temp. asst. school M.O. for Derbyshire.

SMITH, HAROLD, M.D., Western Univ., Ontario, F.R.C.S.E.: R.S.O. at Preston Royal Infirmary.

TYRER, F. H., M.A. Camb., M.R.C.S.: temp. asst. school M.O. for Stoke-on-Trent.

WADDLE, NORMAN, M.B. N.Z., F.R.C.S.E.: R.S.O. to the Royal Infirmary unit of the Royal Sheffield Infirmary and Hospital.

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ORIGINAL ARTICLES

PÆDIATRICS: PAST, PRESENT AND PROSPECTIVE*

BY SIR ROBERT HUTCHISON, Bt., M.D. Edin., LL.D.
PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON; CONSULTING PHYSICIAN TO THE LONDON HOSPITAL AND TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

PÆDIATRICS, in this country at least, is a young specialty. It is true that it is nearly 400 years since the first English book on the subject was published—Thomas Phayer's "Boke of Children"—but it was not until the eighteenth century was well advanced that more interest began to be taken in the diseases of childhood, although there was still prevalent the curious idea that little could be done for them. George Armstrong, in his "Account of the Diseases most incident to children from their Birth to the Age of Puberty," published in 1777, protests against such a notion and deplores the neglect of this field and that the care of infants is commonly left "to old women, nurses and midwives," although William Cadogan had issued a generation earlier his excellent "Essay upon Nursing and the Management of Children." There were other popular books on the subject about this time, but most of them have been justly stigmatised by Gee as "masterpieces of twaddle."

The foundation of a dispensary for children by Armstrong in Red Lion Square in 1769, however, first put pædiatrics on the map. It was high time, for we are told that half the children born in London at this period died before the end of their fourth year. Interest in the subject grew slowly in spite of the publication in 1789 of Michael Underwood's "Treatise on the Diseases of Children," perhaps the most advanced eighteenth-century book on pædiatrics. Armstrong's dispensary did not long survive his death (which occurred about 1783), and it was not until another generation had elapsed that the Universal Dispensary for sick and indigent children was founded in St. Andrew's Hill by Dr. J. Bunnell Davis in 1816 and ultimately, after its removal in 1823 to the Waterloo Road under the name of the Royal Universal Infirmary for Children, became the nucleus of the present Waterloo Road Hospital. In 1829 Manchester started a dispensary for children and Liverpool followed suit in 1832, but the first real children's hospital in the modern sense was opened in Great Ormond Street in 1852, Charles West and Bence Jones being its chief authors. It occupied originally, as is well known, the house formerly owned by Mead, the building which succeeded it and which has only recently been superseded being opened in 1877. The establishment of a large hospital entirely devoted to diseases of children gave a great impetus to the study of the subject, and in 1883 the British Medical Association devoted for the first time a special section to pædiatrics at its annual meeting, Gee being president. The experiment was perhaps premature, for the section did not meet again till 1888, when Cheadle was in the chair, but since then it has been a regular feature at the meetings.

George Armstrong deserves the credit of being the first English pædiatrist, but Charles West (1816–1898) was the chief promoter of the subject in the last century. He was for some years connected with the dispensary in the Waterloo Road and four years before the foundation of the Great Ormond Street Hospital he had published (1848) his "Lectures on the Diseases of Infancy and Childhood" which were delivered to the students of the Middlesex Hospital and which constitute the first really systematic treatise on pædiatrics in the English language. But West was not a "pure" pædiatrist in the sense that he devoted himself solely to children's diseases, for he was also an obstetrician and there was, in fact, for many years a tendency to regard obstetrics and pædiatrics as being in some way inevitably associated. West's successors on the staff of the hospital for Sick Children towards the end of the nineteenth century were even less specialists in children than he, indeed they seem rather to have resented the imputation of being "babies' doctors." Gee (1883), for instance, says, "Looking over the names of the men . . . who made our knowledge what it is I do not find one who could be called a specialist in children's diseases; but the multitude are mad after specialities." On the other hand, outside London there were two men who devoted themselves to the study and treatment of diseases of children exclusively—Henry Ashby (1846–1908) in Manchester and John Thomson (1856–1926) in Edinburgh—and pædiatrics owes to both an immense debt. Before the last war there were few pure pædiatrists in London, but in recent years it has become the rule rather than the exception for anyone who takes up diseases of children to confine himself to that branch of practice. How far this has been an advantage it is difficult to say. It has undoubtedly led to a more rapid advance in our knowledge than would otherwise have been the case and has therefore been good for the science of pædiatrics; but has it been equally good for its practice as an art? Gee said he had no doubt that his knowledge of children's diseases would have been much poorer and meaner had it not been for the larger experience he gained at St. Bartholomew's, and assuredly pædiatrics and adult medicine are capable of throwing mutual light on each other. On the other hand, the public now demand the pure specialist, for it is a true saying that the world suspects a man who can do two things well.

> "One science only will one genius fit:
> So vast is art, so narrow human wit."

"But," says Gee, "art is not yet so vast nor human wit so narrow that the diseases of children need be made a speciality," and as one who has practised both general medicine and pædiatrics I am naturally inclined to agree with him.

THE CULT OF THE CHILD

It is noteworthy that the stimulus to the intensive study of children's diseases came not from our universities or teaching bodies but in response to a public demand, this demand being a consequence of the cult of the child which has been so remarkable a feature of social development in recent years. Down almost to the end of the Victorian epoch there was a surprising indifference to the question of child-health. Families were large and children were regarded as cheap and a heavy mortality amongst them as inevitable. With the movement for social betterment in the first decade of the present century, however, and the introduction of medical inspection of children in the elementary schools, it became apparent how much preventable disease existed amongst the young, and the public conscience was roused. The outcome was a great impetus towards all forms of preventive medicine as applied to the child population and those who were making a special study of disease in childhood came into their own. It was then that pædiatrics was really born in England. Even yet, however, the subject has received little academic recognition. It is a remarkable fact that in the University of London there is no professorship of diseases of children, and only two, and these of recent creation, in the provincial universities. In Scotland also there are two. Very different is the position elsewhere; in America and Canada, and on the continent of Europe, in Scandinavia and even in such small countries as Holland and Denmark, there have long been professorships and well-endowed clinics in the subject.

Cheadle, in an address on The Present Position of the Study of Diseases of Children in Relation to Medical Education, as long ago as 1888 made these recommendations:

(1) Examining bodies should require a knowledge of the subject in the final examination;

(2) They should demand a three months' course of instruction in pædiatrics;

(3) Organised lectures and clinical instruction should be arranged at every medical school;

* A Lloyd Roberts lecture which was to have been delivered at Manchester in November but was cancelled and taken as read owing to the war.

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(4) Children under two should be admitted freely to children's wards.

Fifty years later these recommendations, and especially the first, have not yet been entirely met.

The objection has sometimes been raised to pædiatrics as a specialty that a horizontal division of patients into those below the age of puberty who fall within the sphere of the pædiatrist and those above it who do not, is arbitrary and unnatural. In adult medicine the different specialties are divided by a so-to-speak vertical cleavage and it has been argued that it would be better if this were continued through all ages of life so that a neurologist, for instance, would deal with cases of nervous disease both in children and adults and so with all the other specialties. In theory there is much to be said for this contention but it is not practical so long as there are large hospitals which admit children only and which offer the best field for the study of their diseases. Meanwhile there is a tendency to some degree of specialism even within the limits of pædiatrics; the management of infancy in health and disease and the nervous diseases of childhood, both functional and organic, are becoming almost specialties in themselves, regrettable and unnecessary though this further subdivision may be.

Before closing this short sketch of the rise of pædiatrics in this country mention should be made of the part played in the advance of the subject by special societies. Of these there have been two: first, the Society for the Study of Diseases in Children which was founded in London in the first year of this century largely at the instigation of the late Dr. Sydney Stephenson and which ultimately became the children's section of the Royal Society of Medicine; second, the British Pædiatric Association which dates from 1928 and whose chief progenitor was Dr. Donald Paterson. Both of these societies have done much to foster interest in diseases of children in this country.

CHANGES WITHIN MEMORY

It was about the year 1890 that I first began the study of children's diseases under John Thomson—*clarum et venerabile nomen*—and indeed for some time I had the advantage of being his only pupil at one of the dispensaries in Edinburgh. It is interesting to contrast the raw material of pædiatrics met with in the out-patient room then with what one finds today. The first thing that strikes one on retrospection was the greater appearance of poverty amongst the patients in the old days. Children were often ill-clad, dirty, malodorous and even verminous, conditions which are fortunately rare today. The patient was usually one of a large family, the solitary child being in those days a rare bird. Undernourished children were common and the diseases of malnutrition such as rickets were met with in a flagrant form rarely seen now. Scurvy on the other hand was not, I think, more frequent, probably because few patients could afford the patent foods that usually produce it. Naturally what is now called nutritional anæmia was prevalent and not uncommonly in the chlorotic form of which the modern hypochromic anæmia is but a feeble simulacrum. Even the type of anæmia and splenomegaly associated with the name of von Jaksch was by no means rare and when I was preparing material for the Goulstonian lectures 35 years ago I had still no difficulty in collecting a large number of examples of it. Now, of course, it has almost disappeared.

Methods of infant feeding were different then. Whether artificial feeding was commoner than it is now I am not sure; probably not, for the economy of natural feeding was a strong inducement to these poor mothers to use it and indeed often to continue it too long. Dried milk had not yet been invented, so diluted cow's milk or condensed milks were the staple substitutes. Tube-bottles were the rule rather than the exception, and foul, sour-smelling contraptions they often were. Almost every baby had its comforter. It is not surprising therefore that diarrhœa and vomiting, and their common sequela marasmus, were prevalent to a degree unknown today. Vomiting due to pyloric stenosis was hardly recognised at that time, not that there is any reason to suppose that it was rarer than it is now but simply because it was overlooked. I have an impression, however, that despite this few infants actually died of it. Tuberculosis is still, of course, all too frequent amongst children but it was far more rife in those days, especially in its surgical forms. Edinburgh, it is true, had then a particularly bad reputation as regards surgical tuberculosis, but even when I first went to Great Ormond Street in 1896 cases of tuberculous glands and abdominal tuberculosis were numerous. Congenital syphilis, too, though never really a common disease was certainly commoner than now and occurred in more florid forms.

Bronchitis and pneumonia were frequent, as they still are, but I have a decided impression that upper respiratory tract infections were less severe than they are today. We did not see so many cases of bad mastoid and sinus trouble; perhaps it is that we were unable to diagnose them, and recovery took place without interference. Tonsils were then less subject to enlargement and adenoids were only beginning to be recognised, but, partly on that account I think, more importance was attached to them than to tonsils. The craze for the wholesale removal of tonsils and adenoids, however, was still two or three decades in the future. Dyspepsia in those days usually presented itself in the form of what we called "mucous disease," using the term applied to it by Eustace Smith. It was attributed, and probably rightly, to excessive consumption of carbohydrates, and children suffering from it were amongst the commonest objects in the outpatient room. The hepatic variety of dyspepsia, on the other hand, associated with acidosis and cyclical vomiting, and due to inability to digest fats, which is so common today, was then rare.

The nervous child is, I am sure, met with oftener today than formerly for reasons which will be discussed shortly; but, on the other hand, we are better equipped for dealing with such cases than we were. The late Dr. Guthrie in his delightful book "Functional Nervous Disorders of Childhood" (1907) recognised even then that most functional neuroses in children are of psychical origin, but adds that psychology does not help much in treating them for "psychology deals solely with the normal mind." That is certainly not true now.

There is one disease which does not seem to have changed much in its incidence during the half century, and that is acute rheumatism. It was common then and it is common now, although I am told by my younger colleagues who are still in hospital practice that it seems to be assuming a milder type.

THE PICTURE TODAY

Have any new diseases appeared amongst children in the last 40 or 50 years? It is difficult to be sure. It is well to remember what Gee said, "In general I am not disposed to put much faith in the uprising of new diseases. I find it more easy to believe that they have been overlooked; still more that they have been confounded." None the less it seems true that epidemic and post-vaccinal encephalitis are new-comers. Pink disease, on the other hand, it is easier to believe was overlooked or "confounded." Of course a great many new syndromes have been described in recent years; indeed with their eponymous names they have become rather a nuisance and the exhibition of examples of them makes a clinical demonstration at a meeting of present-day pædiatrists rather like a freak show. Apart from the appearance of new diseases there must already be, and there will be still more in the future, a *relative* increase in the number of cases of pyloric stenosis, congenital heart disease and other deformities, spastic palsies from birth injuries and examples of primary amentia from developmental causes apart from birth injury, for all these conditions are commoner in the firstborn (Still, 1927) and, owing to the prevalent small size of families, there are going to be relatively more firstborn children in the community than hitherto. These products of nature's prentice hand are less likely to be up to standard than those produced after them—one of the remoter results of family limitation which is apt to be forgotten.

Finally, in contrasting hospital work then and now one must remember that the early pædiatrists had to cope with a great mass of disease without the aid of modern diagnostic methods; there were no X rays, no lumbar punctures, no Wassermann or Widal reactions, no clinical pathologists or biochemists and not even an electric ophthalmoscope or auriscope. They had to

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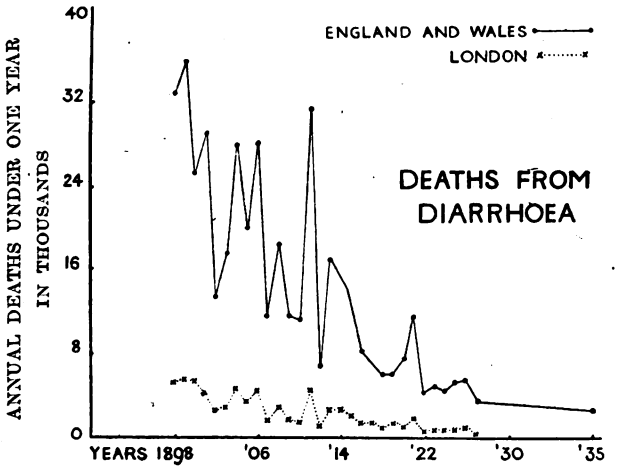
depend on their own unaided senses and had a more interesting, exciting and adventurous time than their successors of today.

PREVENTIVE PÆDIATRICS

Looking back, then, one gets the impression of an immense diminution of serious disease in children now as compared with fifty years ago, and the improvement can be presented statistically. The simplest test is the infantile-mortality rate. This was 156 per 1000 in the last year of last century and is now about 53, and throughout the whole of childhood a diminution almost equally striking is shown. To what extent is this improvement due to preventive pædiatrics in the strict sense—that is, to special measures designed to prevent disease in children such as welfare centres and medical inspection in schools—and how much of it is the result of adventitious circumstances? Speaking for myself I have little doubt that the diminution in poverty which has taken place since the beginning of this century has been the main cause of the diminished child mortality, for poverty with all that it implies is a great promoter of disease. It is true, of course, that children have shared in the benefits of the improved hygienic conditions which have come about and no-one would wish to belittle the work done by welfare centres and the school medical service, but compared with the better feeding, housing and care which an improved economic position of the family makes possible, I think they are unimportant. Striking confirmation of this view is afforded by the statistical investigations of Greenwood and Bradford Hill which showed that the greatest improvement in mortality in the last three-quarters of a century has been in children of pre-school age, although that is an age for which preventive pædiatrics has done least. It is noteworthy, too, that the infant welfare movement was only in its pioneer stage during the first decade of this century; there were not more than 100 centres in the whole of England and Wales in 1911, there are now over 3000; yet during that period the infant mortality had fallen to two-thirds of what it had been 10 years earlier.



THE STORY OF SUMMER DIARRHŒA

Epidemic diarrhœa provides an interesting test case in this connexion. The younger generation of pædiatrists can hardly realise what a plague this used to be. Every year in the late summer, especially if there had been some weeks of heat, as there usually were in those times, scores of these collapsed and dehydrated babies were admitted to the wards and a very high proportion of them died in spite of all efforts at treatment. It was, I remember, very prevalent in the closing years of last century and in 1898 there were about 36,000 deaths in England and Wales from diarrhœa in children below the age of one year—a number nearly equal to the present infantile deaths from *all* causes. That was the peak year, and although there have been recrudescences since, notably in the very hot summer of 1911 when the diarrhœa deaths rose to 32,000, they number now less than 4000, and even the very prolonged heat of the summer of 1921 only caused a rise to 12,000. There has always been some mystery about this scourge of infancy. Although undoubtedly infective, no single organism has ever been identified as the cause of it, in spite of all the efforts of the bacteriologists. For my own part I am inclined to suspect that it may be a virus infection and that the organisms cultivated from the excreta in different epidemics—dysentery bacilli, streptococci and the like—are secondary invaders. Be this as it may, the virtual disappearance of epidemic diarrhœa is as mysterious as its cause. It was always known, of course, to be associated with poverty, dirt, overcrowding and defective sanitation, and the amelioration of all these in recent years must have done much to prevent it. Again, it has been suggested that the replacement of the horse by the car played a part by diminishing the number of flies which were believed to carry infection. It must also be noted that the diminution in the incidence of diarrhœa coincided with the gradually increasing use of dried milks instead of ordinary milk in artificial feeding. It seems reasonable, moreover, to attribute a large share in its abatement to the work of the infant welfare centres. None the less, when all these factors have been taken into account there is, to anyone who has been actively engaged in pædiatrics during the last forty years, something a little inexplicable about the vanishing of this disease and it may be that there has been a decline in the virulence of the infection. My main point, however, is that, as with infantile mortality in general, so in the case of this particular disease, improvement in the economic condition of the poorer classes, and inventions such as dried milk and the internal combustion engine have had at least as much to do with lessening it as any ad hoc measures such as fall under the title of preventive pædiatrics.

CURATIVE PÆDIATRICS

If we turn now to consider the part played by curative medicine in the saving of child life in the last fifty years we shall find that, until quite recently at least, it is rather disappointing. Looking back one is convinced that there are not many diseases that we can cure now that we could not cure then. Diabetes is one of the chief, for whereas it was formerly always fatal in children it is now, though not strictly curable, robbed of much of its terror. The hæmorrhagic disease and the icterus gravis of the newly born are comparatively rare conditions with which we can now cope successfully as we can with congenital pyloric stenosis, and we have also a better control over urinary infections, but—leaving out of account the great possibilities opened up by recent chemotherapy, of which I shall speak later—it is difficult to think of any more. It is not always realised by the younger generation that cod-liver oil was known to be a specific for rickets and orange juice for scurvy long before vitamins were thought of, and looking back I am not sure that the prolonged use of mercury did not give as good results in congenital syphilis as the modern arsenical preparations. We are able to discriminate more varieties of anæmia now than then—I sometimes think the bone-marrow has gone a little mad in recent times—but, except in that small number susceptible to liver extract, our treatment is much as it was, and when we are adjured by hæmatologists nowadays to give iron in large doses in nutritional hypochromic anæmia, I cannot help remembering that when I was a student we were urged to "give it with a shovel." In the treatment of the purpuras, on the other hand, some real progress has been made, but we are as helpless as ever as regards the leukæmias. The principles of treatment in tuberculosis were as well understood then as they are now, nor has there been any material advance in the treatment of acute rheumatism and chorea as compared with that of the days of Cheadle. In many ways, indeed, I think we are not such good therapists as our forbears and that, in the use of drugs especially, we are not as skilled as they. Nor do I think that there has been much real advance in the management of infants, except those that are premature; all that has happened is that knowledge of the best methods has, thanks to welfare centres, been more generally made known and applied. It is true that the tube-bottle has gone into the limbo of forgotten things, but what is put in the bottle is much the same as it used to be in any decent children's clinic. Fashions in this matter have come and gone. At the

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beginning of this century percentage feeding was all the rage but it has departed for good, and we have returned to ordinary dilutions of milk, except that we regulate quantities by the infant's weight instead of by age, whilst as regards frequency of feeding we have swung back to the long intervals advocated by Cadogan in the eighteenth century. Plus ça change, plus c'est la même chose, and I doubt if these changes are necessarily advances. We have become, it is true, "vitamin conscious," and although this has its good side it has also led to great abuses.

As regards the feeding of older children the chief anxiety of the outpatient pædiatrist a generation ago was to see that the child got enough; now that food is more easy to come by the children seem to have lost their appetite for it; an instance of starvation in the midst of plenty, to use a cliché of the moment, the reasons for which must be discussed later.

HOPES FOR THE FUTURE

I have indicated the causes which seem to have led to the great saving of child life during the last fifty years and have now to consider what further improvement in these directions may reasonably be expected in the future. We may expect that the factors which have brought about such a reduction of infant mortality in the past three decades will continue to operate although their effect will be less spectacular. A reduction of overcrowding, for instance, may do something, but it must be remembered that the relation between infantile mortality and overcrowding is not very close. More general breast-feeding, it has often been pointed out, would have a good effect, because the mortality of breast-fed infants from all causes is lower than that of the artificially fed. Dr. J. C. Spence (1938) in a valuable paper published two years ago which led to much discussion deplored what he called "the modern decline of breast-feeding." But is it modern? It will be found, I think, that, like Punch, breast-feeding has never been so good as it was. Spence calculated that in large towns not more than one-third of infants are now breast-fed to the age of six months, but Bunge (1900), in a lecture published in 1900, estimated that only half the women in the cities of central Europe were able to nurse their children at all. One finds the same complaint even in the eighteenth century. Thus Underwood (1789) asserts that mothers often do not feed their own children and says that "this can be charged only to the depravity of the age," and that "depravity of manners has ever been considered as the leading symptom of a falling Empire"—a lament which has a strangely modern ring about it. We may all agree, however, that many more mothers could nurse their babies than actually do so and that the main reasons for this are, as Spence says, indifference and mismanagement. In other words, the reasons are psychological and not physical and are to be got rid of not by improved feeding of the mother but by methods of education and persuasion. As to artificial feeding it is difficult to see how the methods at present in use in the best clinics can be improved upon, but the universal pasteurisation of cow's milk would certainly lessen the incidence of tuberculosis both in infancy and later life besides preventing other milk-borne infections. This is a step in preventive pædiatrics which is bound to come.

It must be remembered that about 40% of the present infantile mortality is due to neonatal deaths, and how difficult it is to prevent these is shown by the fact that whereas the total mortality of infants is about a third of what it was at the beginning of the century neonatal deaths have only fallen by about a fifth. The causes of these deaths of the newly born are various, but prematurity, alone or in association with other conditions, is present in half of them, while birth injuries account for about another quarter. Infections are another important factor. Neonatal mortality is not related to poverty and no improvement in social conditions can improve it. It must be dealt with by ad hoc measures, the most important of which are antenatal supervision to try to prevent premature births, better midwifery and greater individual care of the newly born. Collis (1938), who has given much attention to these cases, thinks that 20% of neonatal deaths are preventable. This may be, but I confess I cannot get up much enthusiasm for trying to save these premature arrivals: I have a strong suspicion that, of those who survive, a large proportion turn out defective either physically or mentally or both. While, then, we may look for a further appreciable reduction in the deaths of infants it is idle to expect that we can bring them down to the level of that of New Zealand, for instance, which is half that of ours, for New Zealand is not, like this, a highly industrialised country, and industrialism is an enemy to infant life. One cannot help wondering, indeed, whether the stinting production and careful saving of infant lives today is really, biologically speaking, as wholesome as the mass production and lavish scrapping of last century.

As regards mortality amongst children of pre-school and school age can much still be done? I think so. Improvement in general hygienic conditions and especially in housing will do something to save lives at both these periods and there are many whose opinion one must respect who pin their hopes to improved nutrition. I have always been rather sceptical about this. There is no evidence that under-nourishment or even malnutrition is widespread amongst the children of this country although there are certainly pockets of it in the more distressed areas. Indeed, it would be surprising were it otherwise seeing that wages on the whole are higher here than in any country in Europe, whilst food is at least as cheap. But it is said that what is needed to prevent disease is not so much the consumption of more food as an increased consumption of the so-called protective foods—milk, green vegetables, fruits and foods containing first-class protein. I have never been convinced that such foods do in fact protect against disease in general, but in any case statistics prepared by the League of Nations show that the consumption of the so-called protective foods is considerably higher per head in this country than it is in any other in Europe (see table),

ESTIMATED ANNUAL CONSUMPTION PER HEAD *

Milk (gallons)	Meat (lb.)	Eggs (number per head)	Citrus fruit (lb.)	—	Births	Deaths	Infantile mortality	Deaths from tb.	Puerperal mortality
89	140	172†	33	U.K.	15·7	12·1	64·7	84·3	4·6
79	110	129	15	Germany	16·3	11·0	78	75·5	5·2
N.A.	82	110	15	Sweden	14·4	11·6	52	114·4	3·4
92	125	86	12	Denmark	18·0	10·8	73	64·2	3·8
98	73	124	21	Norway	15·7	10·4	45	33·2	2·8
80	91	N.A.	28	Netherlands	21·8	9·0	47	65·2	3·2

N.A. = Not available.

* Figures obtained from the annual epidemiological report, League of Nations Health Organisation, 1937, and "The Problem of Nutrition," vol. 4, League of Nations, 1937.

† Includes liquid and dried eggs.

and yet our general death-rate, infantile-mortality rate, puerperal mortality and deaths from tuberculosis compare unfavourably with those of some countries whose consumption of these protective foods is much lower than ours. I am driven to the conclusion that no great diminution in disease is to be expected along these lines nor by the indiscriminate consumption of glucose, orange juice, marmite and fish oil as is now the fashion.

But preventive pædiatrics, in the strict sense, has still much to do. The chief causes of death at pre-school and school ages are respiratory infections, tuberculosis, and some of the infectious fevers, especially measles, whooping-cough, and diphtheria. Against the three last of these, especially, ad hoc measures should be able to do much. Measles as a cause of death, though not necessarily of morbidity, should lose its terrors when convalescent serum becomes more generally available just as severe scarlatina has done since the introduction of anti-scarlatinal serum, and universal immunisation is capable of abolishing diphtheria if only people can be persuaded to adopt it: there is also something to be hoped for from the use of vaccines in whooping-cough. Deaths from tuberculosis, too, should become rare with improved housing, universal pasteurisation of milk and more careful protection of children from contact with tuberculous adults, while the new chemotherapy will help to lessen deaths from respiratory infections. Appendicitis is still the cause of many deaths in childhood, but the

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prevention of these is surely a question of early diagnosis. Death from heart disease also should be rare when acute rheumatism becomes as uncommon in hospital patients as it is in private practice—and there seems no reason why this should not happen. Meanwhile it is a serious reflection on modern civilisation that violence is now one of the chief causes of death amongst children; but this annual massacre of the innocents, largely at the instance of the Moloch of speed, it is not within the power of pædiatrics to arrest.

I have already said that curative pædiatrics has, until quite recently, advanced but little in my day, but we have every reason to hope for better results in the future. The modern developments in chemotherapy especially are pregnant with immense possibilities and may well give us—have indeed already given us—the mastery over many different infections of childhood which have hitherto proved intractable. As the combined result, then, of more favourable conditions of life, of the wider application of preventive pædiatrics and of more potent means of cure it seems not too optimistic to look forward to a time, not so far in the future, when death from disease in childhood will be a comparatively rare event.

THE CHILD AND HIS ENVIRONMENT

But let no-one conclude from this that pædiatrics will soon have done its work and may cease to exist as a special branch of medicine. Health and the absence of organic disease are not synonymous and no experienced pædiatrist would regard the health of the child of today as entirely satisfactory. Children seem to suffer increasingly from functional disorders the result of nervous fatigue or over-excitability. A large proportion of those seen in our consulting-rooms are both neurotic and acidotic; they are restless, bad sleepers, and lacking in a healthy interest in food. Nowadays a mother will say, almost proudly, "my child suffers from acidosis" much as I have heard one say thirty years ago, "my child is a mass of uric acid." Pathological fashion, of course, plays a part in this, but even allowing for that there can be no doubt in my opinion that the type of digestive or metabolic disturbance which for convenience we call acidosis is much commoner than it was. To some degree I believe this to be the result of a change in food habits; to a greater consumption of the "liver" foods (fats, milk, cream, eggs, and oranges) and to a diminished consumption of carbohydrates, but it is probable that this is not the whole explanation. Nervous factors seem to play a part just as they do in migraine which is often the adult equivalent of the acidosis attacks of childhood. Nor are the causes of the nervous disturbances so common in the modern child far to seek. The physical environment as we have seen has improved enormously since the beginning of this century in most material respects but the psychical environment has in many ways deteriorated. It will be generally agreed that the conditions most favourable for a healthy and happy childhood are that the child should be brought up as one of a bunch in surroundings more or less stable and permanent, preferably in the country, and that it should not be over-stimulated mentally or emotionally nor receive too much parental attention. But what do we find? More and more the child of today is the only one of the family or at best one of two. It develops almost inevitably the characteristics of "only childism" with all its difficulties and negativisms. Gone is the happy-go-lucky fatalism of Victorian days. Parents having all their hopes centred in one or two children naturally tend to be over-anxious about them, and this anxiety is unconsciously communicated to the object of it. Such children are not spoilt in the ordinary sense of the term—they are over-studied. They are in the case of a plant which is being always taken up by the roots to see how it is growing.

As to surroundings, more children than ever are being brought up in large cities with their inevitable accompaniments of rush, excitement and noise; the motor, the cinema and the radio have much to answer for in this regard. Nor is modern education free from blame. It must be the experience of every pædiatrist that many children suffer from the strain of school life; not merely too many lessons and examinations but too strenuous a day's routine, and I think this cause of nervous strain tells specially upon children at day schools who have to live the double life of school and home. What the child of today seems to me to need is more neglect and the leisure to develop physically and mentally on his own lines without too much interference.

The importance of these considerations can hardly be exaggerated if it is true, as there is some reason to believe (Kermack et al. 1934) that health throughout life is to a large degree determined by the type of constitution built up in the first few years. If it be so, then the responsibility of pædiatrists is indeed great, but they cannot by themselves deal with those adverse mental and moral factors in the environment of which I have spoken. Such a task is not one for preventive pædiatrics as we now understand the term, it is one for the community as a whole. I wish I could feel hopeful that it will be discharged, but to grapple with it successfully involves a change of heart, of ideals, and of values of which there are few signs today. Yet not until we have improved the mental elements of the environment as we have improved or are improving the physical shall we be able to answer the question, "Is it well with the child?" with a confident, "Yes, it is well."

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AN OUTBREAK OF SONNE DYSENTERY

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Intestinal infection with the Sonne dysentery bacillus is now widely recognised in this country as a cause of acute enteritis in both children and adults, and many outbreaks have been described. Some of the bacteriological findings in the cases here recorded emphasise points in the epidemiology of the infection which are not generally appreciated or are even contrary to current doctrine.

CLINICAL FEATURES

The outbreak occurred in a residential school which was temporarily in use as a nursery for infants and young children. These were received from several nurseries which had to be evacuated, and unavoidably there was some overcrowding coupled with inadequate nursing facilities which greatly favoured the spread of infection. The worst cases were transferred either to the school infirmary or to a local hospital where there were several deaths. On Nov. 15, 1939, the remainder (19) of the then recognised cases were transferred to the North-Eastern Hospital where they were nursed in wards of 31 cots of which 11 were in glass chambers (5 single and 3 double), whilst the remaining 20 in the main ward were separated by glass partitions into 5 bays of 4 cots each. In addition to this subdivision into small groups all cases were strictly barrier-nursed with a view to eliminating any cross-infection from either the alimentary or respiratory tracts. Further cases were admitted up to Dec. 2, making a total of 32 cases altogether.

Course of the illness.—Apart from an initial rise of temperature reported from the school and varying from 98·8° F. to 104° F. (1 case) but averaging about 100° F., most of the patients were apyrexial throughout their illness. In the few instances where pyrexia occurred it was slight, of short duration and due to trivial causes such as dentition, intercurrent coryza or varicella. In 2 cases serious complications developed. In 1 mastoiditis supervened on a chronic otitis media;

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mastoidectomy was performed with good results. The other patient developed appendicitis on the 59th day of convalescence. At operation a spreading peritonitis was found which proved fatal in four days. This was the only death in our series.

Intestinal infection.—Generally speaking the intestinal symptoms were not severe although in several cases there were periods of relapse characterised by very offensive yellow semi-formed stools. There was no relation between these periods of offensive stools and the presence or absence of the specific organism in the dejecta. The average number of stools was about three a day, and in no case was there any evidence of dehydration as a result of diarrhœa. The commonest type of stool was green, loose and offensive and contained mucus. A slightly higher proportion of the stools were alkaline than acid. Only 6 patients passed the typical dysenteric stools containing blood and mucus. In 4 of these no agglutinins were found in the blood. One patient did not exhibit any sign of intestinal disease as evidenced by abnormal stools; this child had *B. dysenteriæ* Sonne in both stool and rectal swab but failed to develop agglutinins. Vomiting was observed in 3 patients on one or two occasions only.

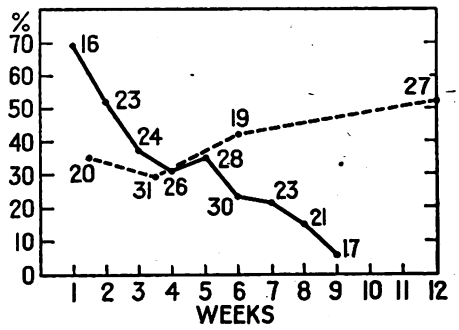
Infection of respiratory tract and ear.—Because it has been suggested that gastro-enteritis may be either a cause for or an effect of respiratory-tract disease attempts were made to ascertain if any such association existed in this outbreak of dysentery. *Rhinitis* was present on admission in 10 instances. In 3 of these cases there was some evidence of otitis media also. *Bronchitis* was present in 5 cases associated with chronic otitis media (1 case) and rhinitis (1 case). The bronchitis was mild and rapidly cleared up. All *drumheads* were examined at regular intervals, making a total of 256 examinations. The drums were found to be normal in 239 instances, reddened in 3, sheen lost in 4 and perforated in 10 instances. The departures from normal were all seen in 10 children and were made up as follows: reddened on one examination in each of 3 children; sheen lost on 2 examinations in each of 2 children; and perforation on 10 examinations in 5 children. Of these last 5 cases 2 had had previous perforations with otorrhœa. Thus gastro-enteritis of dysentery type seems in some degree to be a predisposing factor to secondary infections of the upper respiratory tract.

In order to find if any particular organism was prevalent in the upper air-passages associated with any particular group of symptoms swabs were taken on admission from the nose and nasopharynx and inoculated on to blood-agar plates. By far the commonest organism recovered from both sites was *Staphylococcus aureus*. Next in frequency was the hæmolytic streptococcus, which was found in the throats of 5 cases. All these strains on further examination proved to belong to Lancefield's group C and to Griffith's type 21, but there was little indication that they were responsible for any clinical infection.

BACTERIOLOGY

It was arranged on admission of the patients to the North-Eastern Hospital that a specimen of fæces and a rectal swab should be obtained for bacteriological examination from every patient twice weekly during the first two to three weeks and after that at weekly intervals until discharge. In all some 700 specimens were examined. Each fæcal specimen was inoculated on to one plate of MacConkey's lactose bile-salt agar, and after twenty-four hours' incubation non-lactose fermenting colonies—the large rough colony typical of the Sonne bacillus could usually be recognised naked-eye—were tested for slide-agglutination with the neat serum supplied by the Oxford Standards Laboratory. In most cases agglutination of colonies picked directly from the plates was obtained; of the others very few remained inagglutinable after the first subculture. For the rectal specimen an ordinary throat-swab with a small pledget of cotton-wool wound tightly round the roughened end was inserted, and enough fæcal material to colour the swab was obtained. The swab was rubbed on a corner of the MacConkey plate and the inoculum spread with a loop secundum artem. From the colony used for slide-agglutination a subculture was made on an agar-slope from which tubes of peptone water containing the appropriate sugar (lactose, glucose, mannitol and saccharose initially; later xylose and maltose) were inoculated for fermentation reactions and indole-formation. All strains fermented glucose and mannitol in twenty-four hours and lactose late (sometimes only after two or three weeks' incubation); all were indole-negative.

Convalescent carriers.—It is often stated that the bacteriological diagnosis of bacillary dysentery is difficult because the causal organism is present in the intestine only during the early acute phase of the infection and because it quickly dies out in fæcal specimens without preservative. Our experience in this outbreak directly contradicts these beliefs. The Sonne bacillus was isolated from all but 3 cases (90·6% positive), and it is doubtful if these 3 negative cases were really dysentery infections. Even if they are included the chart shows that the proportion of positive cases falls slowly—not abruptly—during convalescence; 1 case was still positive in the tenth week, and 1 in the twelfth week. This gradual rate of elimination of the infecting organism from the intestine brings Sonne dysentery into line with other bacterial infections, with the same danger to the community of the undetected (or uncontrolled) convalescent carrier. Associated with it is the practical point as to the number of consecutive negative examinations required before the patient should be released from hospital. In the present series of 29 positive cases, 10 patients (34·4%) had two or more consecutive negative examinations followed by one or more positives while 5 of them had 3 or more consecutive negative specimens over a period of three weeks, only to become positive again. That these late positive findings were due to reinfection seems unlikely, for all the patients were barrier-nursed and particular care was taken with their feeds. Our experience in previous years with "return" cases suggests that convalescent carriers of the Sonne bacillus are not infrequently released from hospital. Care must be taken by nursing staff that specimens sent for bacteriological examination in convalescence should not be constipated stools.



Convalescent carrier-rate and antibody-production in cases of Sonne dysentery. Continuous line, patients from whom *B. dysenteriæ* Sonne was isolated; dotted line, patients with agglutinins to *B. dysenteriæ* Sonne. The figures on the lines indicate the number of patients.

Viability in fæces.—Dysentery bacilli of the Flexner group die out quickly in fæcal specimens, and any delay in transit to the laboratory may prevent their isolation on culture media unless some preservative is used. The most popular of these is 30% glycerin in 0·6% saline in the proportion of 2 : 1 of preservative to fæces. Sachs (1939) found that even with glycerin-saline the results were poor, and he traced this to the acidity which develops in the preservative. He therefore recommended a glycerin-saline mixture buffered with Na_2HPO_4 to a final pH of 7·4. Compared with the Flexner group the Sonne dysentery bacillus seems to be a much hardier organism. For example, in 3 different fæcal specimens left standing on the bench at room temperature the Sonne bacillus remained viable for six, seven and eleven days respectively without the addition of any preservative. In other specimens the organisms died out after from twenty-four to forty-eight hours. The variation may depend on the reaction of the fæces. The rectal swab, on the other hand, quickly becomes dried up, and should therefore be inoculated on the culture medium as early as possible.

Fæces versus rectal swab.—It seemed of some practical importance to determine the relative merits of fæcal

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specimen and rectal swab for the isolation of the Sonne bacillus. Fresh fæces is not always easy to obtain from young children, and the material sent to the laboratory is probably often scraped off the napkin. A rectal swab can be easily taken, and the only necessary precaution is that it be sent to the laboratory at once. If this is impossible, a little glycerin-saline or broth at the bottom of the containing tube would presumably act as a preservative, although we have not tested this point. Our figures were as follows :—

Findings	
Fæces and swab positive	36
Fæces negative, swab positive	34
Fæces positive, swab negative	9
Total fæces positive	45
Total swab positive	70
Grand total positive	79

They show that in this hospital series the rectal swab was definitely superior to the fæcal specimen although a few positive results were obtained with the fæces when the rectal swab was negative. Unrecorded analyses indicated that the rectal swab was better both in the acute and convalescent stages of the infection.

Xylose-fermentation.—Subdivision on the basis of fermentation reactions of an organism which is a specific entity, as the Sonne bacillus is, is not favoured in modern bacteriology, although there are examples in the salmonella group. Böjlen (1934) in his fine work on dysentery in Denmark tested 641 strains of the Sonne bacillus on a variety of sugars, and concluded that they could be divided into four groups according as they fermented xylose or not, or fermented maltose early or late. After subculture a number of strains which were late maltose-fermenters became early maltose-fermenters, but the fermentation of xylose, by 9·5% of all his strains, seemed to be a stable character. The subdivision into these four groups was closely correlated with epidemiological data, all the strains from any particular outbreak being either xylose-fermenters or non-xylose-fermenters, and so on. Because of his findings the strains from 24 cases in the present series were preserved in the cold as the first subculture, and tested later for their fermentation of xylose and maltose. All the strains fermented maltose early, and, rather surprisingly, all but 6 of them fermented xylose. Inquiries about the sources of the patients—different nurseries were kept in separate units at the residential school—disclosed the fact that all but 1 of the xylose-negative cases came from the same nursery, in which there was only 1 case with a xylose-fermenting strain and he was infected a full month after the others. The remaining xylose-negative case cropped up late in the outbreak in another small ward. Most of the xylose-positive strains were from patients in the nursery which bore the brunt of the epidemic ; in it there were no cases infected with xylose-negative strains. Thus the findings indicated that there were two different strains concerned in this outbreak, and the epidemiological data suggested that xylose-fermentation may be a useful test for tracing the sources of Sonne dysentery.

There are few records of tests for xylose-fermentation in outbreaks in this country. Carter (1937) in an examination of 120 strains collected from various sources found only 4 (1·6%) which fermented xylose, while there were no xylose-fermenting strains isolated from an outbreak in a mental institution reported by Beck and Buckle (1939). Of 40 strains collected during the past few years by one of us (R. C.) from isolated cases or epidemic outbreaks, including 6 strains from the Luton epidemic in 1937, only 4—all from isolated cases—fermented xylose. Of these 1 was recovered from a technician in the laboratory at a time when material from dysentery cases was being received for examination. However, none of the Sonne strains isolated in the laboratory about that time fermented xylose, and it was therefore concluded that the technician's infection was not contracted in the laboratory.

SEROLOGY

While the detection of agglutinins in the patient's blood is not so often used in the diagnosis of dysentery as it is in enteric, a positive test may be valuable in establishing infection or tracing its source, and particularly so in young children in whom positive reactions do not readily occur in the absence of infection (Blacklock and Guthrie 1937). The diagnostic titre with the smooth Sonne suspension of the Oxford Standards Laboratory is 1 : 10. The sera of all our cases were tested in dilutions of 1 : 10 to 1 : 40 at ten-day intervals ; cases admitted early were first tested in the second week of infection. In all 97 tests were done, an average of 3 apiece for the 32 patients, of whom 19 (59·3%*) reacted positively. The chart, in which the results from patients in weeks one and two ; three and four ; five, six and seven ; and eight to sixteen after infection are pooled, shows that the proportion of positive reactions increased slightly as convalescence advanced.

The repeat tests brought out the interesting point that cases initially negative usually remained negative while the majority of positive cases were repeatedly positive. Thus the 13 negative cases had an average of 3 negative tests each over a period from the first to the twelfth week of infection—e.g., 1 patient had negative tests on the first, second, fourth and seventh weeks, and another on the second, fourth, seventh and twelfth weeks. No satisfactory explanation for this failure to produce agglutinins was obtained. Age was apparently not a factor, for 5 of 9 children under one year of age gave positive reactions, while 4 of the negative reactors were over two years of age. Severity of infection or persistence of the organisms in the intestine did not seem to be correlated with agglutinin formation, for all but 2 of the negative cases had typical symptoms usually associated with an initial rise of temperature while of the 2 cases quoted above with persistently negative Widal tests one had positive fæcal examinations from the second to eighth week and the other from the first to the fourth week. The absence of agglutinin formation in clinically typical and severe Sonne infections has been noted by other workers (MacGill and Downie 1932, Blacklock and Guthrie 1937).

SUMMARY

An intensive investigation of a small outbreak of Sonne dysentery brought out the following practical points.

1. By repeated examination of both fæcal specimen and rectal swab the Sonne bacillus can be isolated from most clinical cases. The rectal swab gives in hospital cases a much higher proportion of positive results than the fæcal specimen.

2. The Sonne bacillus persists in the intestine of a gradually decreasing proportion of cases after subsidence of the acute infection. Thus the convalescent carrier is probably an important reservoir for the spread of infection, and at least three consecutive negative reports should be obtained before a patient is released from hospital.

3. The Sonne bacillus is more resistant than other dysentery bacilli to external destructive agents, and may remain alive for days in fæcal specimens if no preservative is added.

4. The fermentation of xylose by certain strains of the Sonne bacillus is closely correlated with epidemiological data, and may thus be helpful in tracing the source or mode of spread of an epidemic.

5. The Widal reaction has some diagnostic value in Sonne dysentery, but a proportion of clinical cases fail entirely to produce any demonstrable agglutinin in the blood.

We wish to thank Mr. K. G. Prentis, laboratory assistant, who did the major part of the technical work.

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* If the 3 patients from whom the Sonne bacillus was never isolated are excluded the proportion of positives is 65·5%.

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PORPHYRINURIA
IN A CASE OF INDUSTRIAL METHYL CHLORIDE POISONING

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It is now recognised that many drugs and industrial poisons may give rise to varying degrees of porphyrinuria. Thus the sulphonal group of drugs has for some time been associated with the development of porphyrinuria, but recently Rimington and Hemmings (1938, 1939) have reported increased excretion of urinary porphyrins after the administration of drugs of the sulphanilamide series and certain related nitro- and amino- compounds. Their results were based for the most part on animal experiments but comparable results were obtained in human subjects undergoing treatment with sulphanilamide. It was also observed that the tendency of a drug to cause porphyrinuria was associated with its ability to form methæmoglobin.

Rimington and Goldblatt (1940) have suggested that increased excretion of urinary porphyrins provides a means of selecting workmen showing hypersensitivity to nitro- and amino- bodies, and of deciding whether or not an affected worker may safely return to work. This type of porphyrinuria was attributable to disturbance of liver function, possibly associated with increased destruction of blood-pigment. The oxidised pigment is converted partially into porphyrin rather than bile-pigment, and Dobriner (1937) has actually isolated this pigment from the urine of many cases of liver dysfunction and has identified it as coproporphyrin series III. The other naturally occurring isomer, coproporphyrin series I, appears to be a by-product of hæmoglobin synthesis and bears a close relationship to the rate of erythropoiesis in the bone-marrow (Rimington 1938, Dobriner and Rhoads 1938).

Many workers have investigated the mode and sites of production and degradation of hæmoglobin, yet much of the story of pigment metabolism is still obscure. Evidence that the bone-marrow is the site of formation of hæmoglobin has been presented by Watson and Clarke (1937), who have found high concentrations of protoporphyrin in the reticulocytes and relatively small amounts in the mature erythrocytes. Grotepass (1937) has since identified this porphyrin as belonging to series III. The change from proto- to copro-porphyrin requires the substitution of propionic acid residues for two vinyl groups, and is theoretically possible by the addition of formic acid. This conversion has never been carried out in vitro; the claim of van den Bergh and his associates (1932) that the liver was responsible for the change has since been denied.

During the present investigation of a case of industrial methyl-chloride poisoning coproporphyrin series III has been found in large amounts both in the urine and fæces, the quantity decreasing with the disappearance of toxic symptoms. It is interesting to note that Watson (1937) found coproporphyrin series I in all specimens of fæces, even including those from cases of lead poisoning, where the urinary coproporphyrin was of the series-III configuration. In the urine only traces of protoporphyrin were found, but the amount in the fæces was considerable.

CASE-RECORD *

A refrigerator engineer, aged 38, was admitted to the Manchester Royal Infirmary on May 21, 1940, suffering from severe methyl-chloride poisoning. His earlier health had been good. By July 8 toxic symptoms had almost disappeared, and the patient was discharged from hospital. The patient showed the typical clinical picture described by American workers, with delirium, convulsions and tremor. His blood-count was normal throughout; hæmoglobin was 90% on admission and had risen to 100% when he was discharged; reticulocytes were 0·8% on admission and sternal puncture showed nothing abnormal in the cytology of the bone-marrow. Fragility of the erythrocytes was normal. A lævulose-tolerance test showed evidence of slight hepatic insufficiency, but there was no jaundice; the direct van den Bergh reaction was negative and the serum contained 0·6 unit of bilirubin. The Takata-Ara test was negative. There was no albuminuria and the urea-clearance test showed no impairment of renal efficiency (May 27). The urine was normal in colour, being rather cloudy; it did not darken on standing; it contained no bile and there was no increase in its urobilin content.

DETERMINATIONS OF PORPHYRINS

Specimens of urine were collected over 24 hours, and, after being acidified with glacial acetic acid were extracted with ether for 12 hours in continuous extractors. The addition of the acid was carried out in a ten-litre precipitating jar on account of the copious evolution of carbon dioxide from the heavily carbonated urine. The ether-soluble porphyrins were fractionated according to the method employed by Rimington and Hemmings (1939). The coproporphyrin was determined by means of a Hilger-Nutting spectrophotometer from the observed intensity of the 549 mμ band of the acid porphyrin spectrum. A solution of pure coproporphyrin I was found to have $E^{1\%}_{1\,cm.}$ (549 mμ) = 208,† which was taken as the basis of the determinations. Only traces of protoporphyrin, insufficient in amount for accurate quantitative determination, were present. The urine from which ether-soluble porphyrins had been extracted was subjected to chromatographic adsorption on alumina followed by elution with dilute ammonia. By this procedure only very small quantities of uroporphyrin could be detected and an examination of the corresponding fraction from the fæces gave no indication of the presence of this pigment. For a period of 12 days fæces were collected under acetone and the copro- and proto-porphyrins separated and determined spectrographically. Protoporphyrin figures are recorded on the assumption that this pigment has the same intensity of absorption as coproporphyrin. Both urinary and fæcal coproporphyrin samples were esterified and the methyl ester in each case was completely soluble in cold dry ether. After crystallising from ether-chloroform and removal of a brown oxidation product with 5% hydrochloric acid, characteristic crystals of coporporphyrin series-III methyl ester were obtained (fig. 1). The melting-point of the crystals was 145° C., remelt 165° C.

FÆCAL PORPHYRIN EXCRETION IN A CASE OF METHYL-CHLORIDE POISONING

Period of collection (days after admission)	Fresh wt. of stools (g.)	Fæcal coproporphyrin III (mg./day)	Fæcal protoporphyrin (mg./day)
23, 24, 25	254	4·0	1·3
26, 27, 28	374	2·48	1·4
29, 30, 31, 32	406	0·20	0·76
33, 34, 35	483	3·5	1·48

RESULTS

The data regarding porphyrin excretion in the case are presented in the table and shown graphically in fig. 2. A maximum value for urinary excretion of coproporphyrin III was recorded a week after admission and the quantity declined, with recurrent spasmodic increases from that time till about 40 days later, when the level was 40 μg. per day. The case is at once unusual because normally only traces of the series-III isomer are found, although up to 60 μg. coproporphyrin I are excreted daily in the urine, and 250–350 μg. in the fæces.

The fall in urinary excretion of coproporphyrin series III was associated with clinical improvement. It is

* A report of the case from the clinical aspect is being published elsewhere by Dr. A. Morgan Jones.

† $E^{1\%}_{1\,cm.}$ is the intensity of absorption, log. (I_o/I), for a 1 cm. layer of a 1% solution, where I_o is the intensity of the incident light and I is the intensity of the transmitted light.

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noteworthy that by the end of the first week, when excretion was at a maximum, hæmoglobin was 98% and red cells 5,020,000. Earlier specimens may have contained even more porphyrin, but the tests could not be carried out at the time. The figures for fæces were

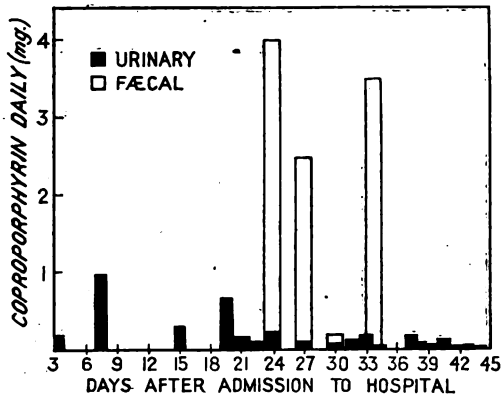


FIG. 2—Excretion of coproporphyrin III in a case of methyl-chloride poisoning.

remarkably high, even five weeks after admission to hospital.

DISCUSSION

A considerable number of cases of methyl-chloride poisoning have been reported in America, chiefly because of the widespread use of the gas in domestic refrigerators (Baker 1927, Kegel, McNally and Pope 1929). It has but a slight smell, and being difficult to detect it has caused many cases of poisoning, some of them fatal. Roth (1923) concludes that poisoning occurs by inhalation of large amounts of the gas, but in susceptible individuals ill effects may appear from the repeated inhalation of smaller quantities over a period of several days. Clinically the gas seems to have its greatest action on the respiratory and nervous systems, but it is possible that the toxic properties of the commercial material are due to some unidentified impurity.

The origin of the porphyrins in the case described here is of interest. There was little or no anæmia and tests showed neither excessive blood destruction nor an increased rate of blood regeneration. Moreover, hæmolytic anæmia is not characterised by excretion of coproporphyrin series III—for the series-I isomer was found in such cases by Watson (1937). Judged by the lævulose-tolerance test there was slight evidence of impaired hepatic function soon after admission: thus blood-sugar increased from 86 mg. to 118 mg. per 100 ml. during one hour after taking 50 g. lævulose, and remained as high as 109 mg. per 100 ml. after 2½ hours. The test figures were normal within a week. The Takata-Ara test was normal on the ninth day after admission, about the time when porphyrin excretion was at its maximum. Since there was no sign of hyperactivity of erythropoiesis it seemed more likely that some interference with hæmoglobin breakdown was the cause of the high excretion of porphyrins rather than an abnormal formation of pigment during hæmoglobin synthesis. Little is known regarding the manner in which methyl chloride upsets normal synthesis and degradation of hæmoglobin, but undoubtedly it is detoxicated by oxidation, probably in the liver, to formic acid and finally to carbonate, which appeared in abundance in the urine of the present case. Baker (1927) found that 18 out of 21 men intoxicated with methyl chloride were voiding alkaline urine. He also found traces of formates in proportion to the extent of the symptoms, and ammonium formate was detected before notable signs or symptoms of intoxication appeared.

It is possible that much of the irritation of the nervous system is due to sudden demands on the alkali reserve of the body as a result of the hydrochloric acid formed from the poison. Baker found that the administration of large doses of alkalis helped to alleviate symptoms after immediate removal from contact with the gas.

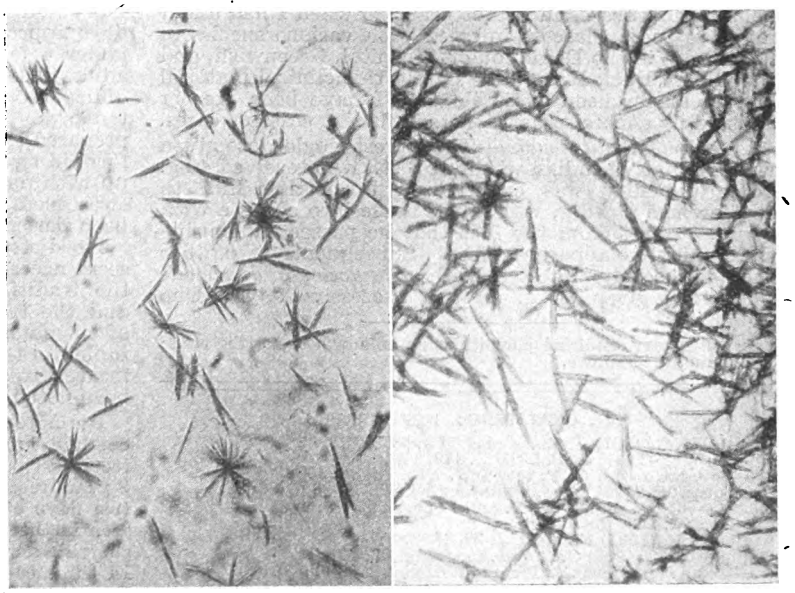
The acidosis produced by the breakdown and oxidation of methyl chloride to hydrochloric and formic acids may cause hæmoglobin breakdown to be diverted from its normal course. Normally bile-pigment is formed while iron and globin are still attached to the molecule (Lemberg 1935), and the hæmatin moiety suffers oxidative fission to give rise to biliverdin without going through a porphyrin stage. However, iron is readily removable by dilute acids and it is possible that the acids liberated in the liver and spleen are responsible for the removal of iron from some of the erythrocytes undergoing destruction in the reticulo-endothelial system. The less reactive protoporphyrin series III nucleus is formed, and, after breaking away from the globulin residue, is excreted as coproporphyrin in the fæces. For the change from proto- to copro-porphyrin, theoretical addition of one molecule of formic acid to the vinyl group is required. It is attractive to consider that formic acid derived from methyl chloride played a rôle in this conversion, but sufficient data concerning this action are lacking. Indeed, one can no more than speculate as to the origin of the porphyrins excreted in this case, but the large quantity found in relationship to methyl-chloride poisoning seems well worthy of note.

Urine from three asymptomatic refrigerator engineers (colleagues of the patient) has also been examined, but no excess of ether-soluble porphyrins was detected.

SUMMARY

The occurrence of large amounts of porphyrins in excreta of a case of industrial methyl-chloride poisoning is described. The effects of methyl-chloride poisoning appear to resemble those produced by certain nitro- and amino-compounds, as well as drugs of the sulphanilamide group which probably act on the liver, interfering with normal breakdown of hæmoglobin.

Our thanks are due to Dr. J. F. Wilkinson for facilities given for this study, to Dr. C. Rimington for supplying a standard solution of coproporphyrin, and to Dr. A. H. Holmes under whose care the patient remained while in the infirmary.



URINE FÆCES

FIG. 1—Crystalline coproporphyrin III methyl ester from urine and fæces of a case of methyl-chloride poisoning. The rosettes are highly characteristic of this compound. (× 400.)

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PHENOTHIAZINE AS AN ANTHELMINTHIC IN THREADWORM AND ROUNDWORM INFECTIONS

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PHENOTHIAZINE (thiodiphenyl-amine) is a thiazine dye and the parent of a large number of these substances, including thionol, Lauth's violet and methylene blue. It is a fine, smooth, pale lemon-yellow powder, almost insoluble in water and almost tasteless, and melting sharply at 180° C. It was first prepared by Bernthsen in 1885, but no evidence of its parasiticidal properties was obtained until 1934, when Campbell and his colleagues reported on its toxicity for culicine larvæ. As the result of a report of Knipling (1938) on the efficiency of the dye in preventing the development of horn-fly larvæ in the fæces of cattle a trial was carried out by Taylor and Sanderson on pigs infected with ascaris at the veterinary laboratory of the Ministry of Agriculture, but no definite conclusions were arrived at. In 1939 the dye was found in Australia and Canada to be effective against strongyloid worms in sheep, and this was afterwards confirmed by Taylor and Sanderson (1940) for the Agricultural Research Council.*

Phenothiazine is highly effective against the strongyloids in the large intestines of animals, and is also toxic to stomach worms associated with parasitic gastritis, but it is less efficient in the small intestine. Domestic animals in general are remarkably tolerant to the drug, and there is a great difference between the therapeutic and toxic dose. Two sheep and a goat, as reported by Taylor and Sanderson, were dosed with eighty times the effective anthelminthic dose without any signs of intoxication. Repeated small doses are, however, considerably more toxic than occasional large ones. In animals a total dosage of 0·5 gramme per pound body-weight is safe, and on this basis a man of 12 st. could safely be given up to 84 g., but dosage of this magnitude is unnecessary. The dye is mostly excreted in the urine, which is tinged red 20–30 minutes after its administration; it has been shown to act as a urinary antiseptic (Thomas et al. 1938, de Eds et al. 1939).

EFFECT ON HOOKWORMS, ROUNDWORMS, AND WHIPWORMS

I first began to use phenothiazine in the treatment of helminthic diseases in man a year ago when I had under my care Indian lascars infested with various species of nematodes in the Dreadnought Hospital, Greenwich, and the Albert Dock Hospital. Lately this clinical material has no longer been available, but I have been greatly assisted by general practitioners in finding suitable cases.

Ancylostoma duodenale.—The largest single dose given was to a native Indian weighing 8 st., who received 40 g. Some difficulty was experienced in getting him to swallow the powder, which was made into a paste with syrup. Apart from the fact that he passed pink urine the dye had no apparent effect. Subsequently two other Indians heavily infested with *Ancylostoma duodenale* were each given 30 g. on two successive days. One passed 8 dead worms, but in the second there was no result. In both patients no hookworm eggs could be found in the fæces for three days after the last dose of phenothiazine, but they then reappeared; subsequent treatment with oil of chenopodium and carbon tetrachloride removed the worms. It therefore seems clear that phenothiazine is ineffective for hookworms in the small intestine, and it should be noted that in animals also it has proved useless for worms in that part of the gut.

Ascaris lumbricoides.—An attempt was next made to find the optimum dosage for roundworm infection in seven native patients (six Indians and one Egyptian); five had a double infection of roundworm and hookworm, and the other two a double infection of roundworm and the whipworm (*Trichuris trichiura*). They received a total dosage ranging from 16 to 48 g., as follows: 4 g. daily for four days; 6 g. daily for five days; or 4 g. daily for four days followed by 8 g. daily for four days. Only one dead roundworm was recovered, and the drug had no effect on the whipworms.

Soon an opportunity presented itself for treating 2 further Indians heavily infected with roundworms. In these 8 g. of phenothiazine in powder was exhibited on three consecutive mornings (24 g. in all), followed by ʒ 3 of sodium sulphate. The results were much more satisfactory.

CASE 1.—Multiple infection with roundworms, hookworms, whipworms, and threadworms (egg-count: roundworm 314, hookworm 63, whipworm 20 eggs per 1 c.cm. of fæces). After the second dose 9 dead roundworms (8 females and 1 male) and 21 dead threadworms were passed. The first 4 roundworms which appeared were stained bright red. Another female roundworm was passed after the third dose. On subsequent fæcal examination roundworm ova were absent, but hookworm and whipworm eggs were undiminished in number; treatment with oil of chenopodium and carbon tetrachloride produced 53 dead hookworms.

CASE 2.—Heavy infection with roundworms (egg-count 350 eggs per 1 c.cm. of fæces). After the second dose 10 males and 2 females were passed dead, of which the first 5 were stained red. On subsequent examinations ova were absent from the fæces.

In neither of these cases were any toxic symptoms noted. The urine was stained pink 20 mins. after the first dose, and remained so until two days after cessation of treatment.

EFFECT ON THREADWORMS

Therapeutic trials have been carried out on *Oxyuris vermicularis* infections, and, especially in children, phenothiazine has given consistently satisfactory results. Smaller doses are required than in roundworm infections. For children under 8 years a dose of 2 g. daily for seven days appears to be sufficient, and half this for children under 4 (about 0·17 g. per pound body-weight). For adults of both sexes, in whom threadworms are as a rule difficult to eradicate, the dose is 4–8 g. daily for seven to ten days. To facilitate administration, the drug has been prepared by Imperial Chemical Industries Ltd. in tablet form in two strengths, containing 0·5 g. and 1 g., made up with ox bile. More recently a granular preparation sweetened with limejuice and suitable for children has been perfected.

No dietetic restrictions are required, and it does not seem necessary to give aperients. There is no need for the traditional cotton gloves and mercurial ointment, and the treatment does away with the unpleasantness of enemata. The drug is almost tasteless, and either the tablets or the granular preparation can easily be concealed in sweets or chocolate. No disagreeable after-effects have been noted; one child had a slight rise of temperature.

During August, 1940, phenothiazine was given to four children infected with threadworms. A boy aged 4 years received 0·5 g. daily for seven days, and three girls aged 7 or 8 years received 1 g. daily for seven days. During the first two days of treatment numerous active threadworms were seen in the stools. On the third day many were seen to be sluggish and the remainder dead; some were stained red. In three cases no more worms have since been seen during three months' observation. In the fourth case, a boy who received the smaller dose, there was a relapse, but a course of 1 g. daily for seven days produced a permanent cure.

In a family infected with threadworms the father and mother had been infected for at least six years. Quassia

* In veterinary medicine phenothiazine is known under the trade name of Phenovis.

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irrigations, santonin, beta-naphthol and hexylresorcinol had been tried without avail. The father (aged 44) and mother (aged 39) received 2 g. of phenothiazine daily for five days; the daughter (aged 7) received 1 g. daily for five days; and the son (aged 4) received 0·5 g. daily for five days. A drachm of sodium sulphate was given after each dose of phenothiazine. A cure was effected in all except the father, who relapsed, but he was subsequently cured by a course of 4 g. daily. It seems clear that a daily dose of 2 g. is sometimes too small for adults.

A man of 47, complaining of loss of weight, mental irritability and anal itching, was found to have a heavy infection with oxyuris in September, 1940. He was given 4 g. of phenothiazine daily for four days. After the third dose dead worms were found in the fæces, and he continued to pass them for the next two days; at the same time the anal itching ceased. After a week some more live worms were seen and the course was repeated, with an apparently permanent result.

From this brief experience in adults it appears that doses of 4 g. are inadequate, and that in future 8 g. daily should be given for not less than five days, as in ascaris infections.

More reliable information about the effects of phenothiazine on threadworms has been obtained by Dr. G. M. Vevers from the treatment of a young gorilla at the Zoo.

This animal was heavily infested with ancylostomes, œsophagostomum and threadworms. It was given 0·3 g. of phenothiazine on the three successive days, March 13–15, 1940. As a result 18 œsophagostomum worms were passed in a dead or dying condition with an unspecified number of threadworms. The gorilla died on May 14, and at the autopsy, done by Col. A. E. Hamerton, no œsophagostomums or threadworms were found in the intestinal canal, though large numbers of ancylostomes were present and had undoubtedly caused the animal's death.

The larger apes, besides harbouring many of the intestinal parasites common in man, react in the same way to anthelminthics, so that the effectiveness of these comparatively small doses of phenothiazine in the gorilla are significant.

SUMMARY

Phenothiazine, a thiazine dye, has been shown to be effective against culicine larvæ, against strongyloid worms in sheep, and against stomach worms in animals. It is excreted in the urine and acts as a urinary antiseptic.

Three Indian lascars infested with *Ancylostoma duodenale* were given phenothiazine in doses ranging from 30–40 g. but the results suggest that the drug is ineffective for worms in the small intestine; similar results have been found in animals.

Nine patients with ascaris lumbricoides were treated; five had a double infection with roundworms and hookworms and two a double infection with roundworms and whipworms. These seven patients were given total doses ranging from 16 to 48 g. Only one roundworm was recovered and the whipworms were unaffected. Of the remaining two patients, one had a multiple infection with roundworms, hookworms, whipworms, and threadworms, the other had roundworms only. They were given 8 g. daily for three days, followed by a dose of sodium sulphate, and results were more satisfactory, all the roundworms being removed.

Phenothiazine has given good and permanent results in the treatment of threadworm infections, especially in children. Effects on six children and three adults are recorded; all were cured, though three (one child and two adults) required a second course. The following doses are advised: 2 grammes daily for seven days for children under 8, and half the dose for children under 4; 8 grammes daily for at least five days for adults.

I am indebted to Dr. Geoffrey Lapage of the Institute of Animal Pathology, Cambridge, and to Dr. E. L. Taylor of the Veterinary Laboratory, Cambridge, for their help; to Dr. A. Winder of Westerham, and Dr. C. A. Lupton of Farnborough for records of private cases; to my house-physicians Dr. B. Freedman and Dr. S. W. Hinds; and to Mr. A. H. Walters, technical assistant. The Agricultural Research Council and Dr. C. M. Scott of Imperial Chemical Industries, Ltd. kindly supplied me with phenothiazine.

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VOLVULUS OF THE INTESTINE WITH INTERTWINING LOOPS

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VOLVULUS leading to the intertwining of two loops of bowel is much rarer than volvulus due to twisting of the bowel about its mesenteric axis. Entanglements of the kind are most often found between the sigmoid colon and a loop of terminal ileum; they are more rare between two loops of small intestine, and rarest between the cæcum and a loop of small bowel.

CASE REPORT

A woman aged 50 was admitted to hospital with excruciating colicky abdominal pain which had started suddenly at 4 A.M., and was felt diffusely in the abdomen and in the back. She felt a desire to relieve it by passing a stool, but could not even expel flatus. She had vomited once that morning. She had had a somewhat similar attack three years before, which had ceased spontaneously.

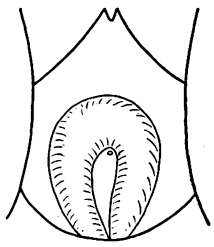

FIG. 1—Omega loop, showing waves of peristalsis through abdominal wall.

The abdomen was distended centrally by the outline of an omega-shaped loop, showing waves of peristalsis, and rising from the pelvis (fig. 1). The abdomen was soft and not tender. The rectum was empty. The patient had a good pulse (66), and a subnormal temperature (97·6° F.). The condition was diagnosed as volvulus of the sigmoid colon, and operation was performed under spinal anæsthesia. The peritoneal cavity contained bloodstained exudate and what looked at first sight like a volvulus of the sigmoid colon. The sigmoid loop, about 2 feet long, was plum-covered owing to strangulation, and its mesentery was thick with extravasated blood and serum. Rotation of the loop did not relieve the strangulation, and a closer inspection showed that the sigmoid colon (fig. 2A) was strangulated by a loop of small bowel (fig. 2C) wound tightly round its base. Coils of small intestine, about 2 ft. long, and also plum-coloured from strangulation, were seen to the left of the sigmoid (fig. 2B). The two loops of strangulated bowel were separated by the rest of the small intestine with its mesentery (fig. 2D); this part of the small intestine was not strangulated. Immediately to the left of the coil of ileum encircling the sigmoid loop there was an arch (fig. 2E) formed by the mesentery of the unaffected portion of the small intestine, and this arch was also tightly compressing both the strangulated loops of bowel. When a finger had been placed under this arch the loop of ileum encircling the sigmoid was seen to be continuous with the loop of strangulated ileum. By lifting the arch of mesentery it was possible to reduce the strangulated

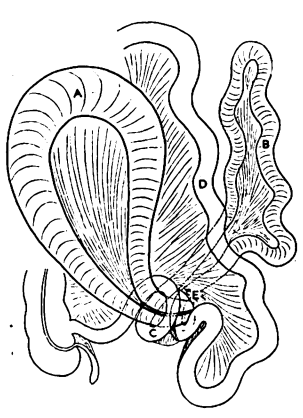

FIG. 2—Condition found at time of operation. A, sigmoid loop. B, strangulated loop of ileum. C, loop of ileum encircling base of sigmoid. D, normal portion of small intestine. E, arch of mesentery strangulating bowel.

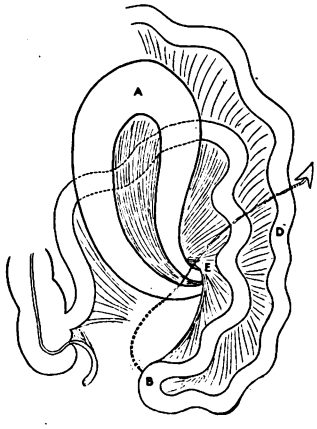

FIG. 3—Condition found when the strangulated loop of ileum had been reduced from under the strangulating arch of the mesentery. Arrow shows path taken by ileal loop.

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loop of ileum from the left to the right under the arch. After that the sigmoid was relieved of the loop of ileum which encircled it, and the loop of ileum was relieved of the arching mesentery which was strangulating it (fig. 3). It was now easy to lift the mesentery of the small bowel and replace the sigmoid colon in its normal position on the left side of it. After the relief of strangulation, the loops of bowel retained their plum-colour and the hæmorrhagic effusions into their mesenteries. Resection was considered, even though the bowel was viable, as a safeguard against the profound shock likely to result from release of strangulation of these long loops of bowel. It was decided however, to leave well alone and the abdomen was closed.

Soon after the operation the patient was comfortable with a good pulse (96). Half a pint of normal saline was given intravenously, and also an injection of anti-gas-gangrene serum. Four hours after operation she had a pulse of 140, and two hours later the pulse was almost imperceptible at the wrist, and she was restless, cold and bathed in a clammy sweat; 200 c.cm. of 10% sodium chloride solution was given intravenously, followed immediately by a pint of glucose saline intravenously. The pulse improved, the patient became warm again, her bowels moved three times, and she went to sleep. From that time on she made an uninterrupted recovery.

COMMENTARY

This patient had an unduly long loop of sigmoid colon with a narrow base which could easily have given rise to the more usual type of volvulus from twisting of the bowel about its mesenteric axis. Possibly her previous attack was due to a partial axial twist of the sigmoid colon which had corrected itself spontaneously. In the present attack the sigmoid colon must have swung to the right and a loop of the ileum descending in front of it (fig. 3) must have passed round the sigmoid loop at its base and under the arch of the mesentery of the small bowel. By this time there would be a coil of ileum tightly encircling the sigmoid and the arch of mesentery would now be pressing on the loop of ileum which had passed under it to the left, producing the condition found at operation.

Reviews of Books

Malignant Disease and its Treatment by Radium

By STANFORD CADE, F.R.C.S., surgeon to the Westminster Hospital, Mount Vernon Hospital and the Radium Institute. Bristol: John Wright and Sons. Pp. 1280. 75*s*.

THIS important textbook begins with two sections on radium, discussing the physics, the biological effects of radiation on normal and malignant tissues, and methods of applying radium in the treatment of malignant disease. The first chapter is on conventional lines, but there follow three chapters—radium teletherapy by H. T. Flint, radium dosimetry by C. W. Wilson, and the measurement of radium plaques by L. H. Gray—which are exceptionally good. The last is an example of how a chapter describing a scientific method should be written—clear, concise and complete. The author writes of radiosensitivity and radiation effects, summarising effectively much of the experimental work from European and American sources, though little of the work which has appeared in the last three years is mentioned. The clinical studies of radium reaction, particularly of excessive reactions frankly described as radium burns, merit careful study, but most therapists would hesitate to accept the statement that the total lymphocyte count may be allowed to fall to under 50 without danger to the patient.

Part 3 is a long study of malignant disease and its treatment and illustrates the difficulty of combining a clinical and pathological discussion on cancer as a whole with detailed descriptions of one method of treatment. Cancer in most of the common sites is included whether radium can profitably be used for its treatment or not. As a result, space is given to information which could be obtained in any good surgical textbook, and the details of Mr. Cade's own interesting original methods are overcrowded. The clinical descriptions are always satisfactory, but the pathology is at times unnecessarily elementary, and accepts a good deal which is still controversial—for instance, the existence of lympho-epithelioma. The results quoted from Mr. Cade's own cases show that the methods described have great value when used in the light of experience. Some of the illustrations are, however, unfortunate, and show implants which do not appear adequate for the cure of the lesion pictured. The chapter on the cervical lymphatic glands, good as it is, would have been improved by the inclusion of survival figures. The importance of teleradium treatment for cancer of the tonsil, pharynx and larynx is clearly shown, and descriptions of this method are the outstanding feature of the work. The chapters on cancer of the breast and uterus are adequate, and the reported results satisfactory. Much work on the treatment of sarcoma has been carried out at the Westminster Hospital, so that this account of the methods used is welcome. Some striking results are shown, but the impression that osteogenic sarcoma is an intractable disease remains.

The book is so large as to be difficult to handle, but it is well produced and illustrated.

Practical Bedside Diagnosis and Treatment

By HENRY JOACHIM, M.D., F.A.C.P., chief-of-medicine, Israel-Zion and Beth Moses Hospitals, New York. London: Baillière, Tindall and Cox. Pp. 834. 41*s*.

"EXPERIENCE is living in the past and in medicine constitutes correct diagnostic memories with a rectification of errors of the past and an attempt to avoid a recurrence of a previously faulty conclusion." That rather awkward statement expresses clearly enough Dr. Joachim's purpose in writing this book. After thirty-five years in the practice and teaching of medicine his attitude is frankly empirical. Diagnosis has to be learnt, and the ultimate aim of diagnosis is treatment; both are grounded very largely on experience. This volume is a statement of what Dr. Joachim has learnt. It covers most of general medicine, with some of the border-country between medicine and surgery. It is written in a dry clipped style, close-packed and full of detail, but lacking light and shade. Its viewpoint is almost purely clinical; the laboratory is a secondary diagnostic adjuvant. Not only what usually happens but also what can occasionally happen in every disease discussed is patiently set forth. The book abounds in eponymous signs and symptoms. It reads as though Dr. Joachim's claim to have written of little except what he has seen is well founded, but here and there he seems to have copied mistakes from the textbooks, as when he says without qualification that the spleen is palpable in Weil's disease. In places he is scarcely up to date. We may forgive him for sharing the early American reluctance to recognise the full virtues of sulphanilamide and sulphapyridine, but we are surprised at his caution in allowing of psittacosis merely that "it is probably due to a virus." Medicine does not appear in these pages as a synthesis of applied science—physiology and pathology—with clinical observation. For that reason, and also because of the monotonous evenness of presentation—like walking through miles of fir-trees—we should not recommend Dr. Joachim to the medical student, or for steady reading: but to the house-physician and his seniors, as a book of reference and a storehouse of clinical reminders, he should be very valuable.

War-time Nurse

Edited by J. M. MACKINTOSH, M.D., D.P.H., chief medical officer, the Department of Health for Scotland. Edinburgh: Oliver and Boyd. Pp. 242. 5*s*.

DISTINGUISHED members of the medical and nursing professions have contributed short articles to a collection published in this small book. The advice given throughout is essentially practical, sensible and up to date. Miss Margaret C. Marshall's contribution to the article entitled "The New Nurse" should be carefully read and thoroughly digested by every probationer. Especially timely is Miss Catherine A. Macdonald's article on the nursing of burned patients. Things have reached a pretty pass when an article on midwifery must embody advice on air-raid precautions and how to protect the newly born against the effects of poison gas but Dr. Charlotte A. Douglas writes nonchalantly of such matters, accepting them as a matter of course.

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THE LANCET

LONDON: SATURDAY, DECEMBER 28, 1940

FORETELLING BREAKDOWN

IT is easy to maintain that the psychiatrist is better fitted than anyone else to select stable recruits but more difficult to demonstrate that he can do it well. DESMOND CURRAN and W. P. MALLINSON [1] point out that the economical use of man-power is increasingly important and consider that it should be the responsibility of psychiatrists not only to reject recruits who are liable to break down or prove ineffective but to ensure that these men are put in positions suited to their capacity. They have sought indications on which rejection could be based and they plead for administrative changes which will enable the psychiatrist to place the misfits. If he is to predict he must have criteria; if he is to allocate jobs must be available; and if he is to do either well he must know what will be required of his man in the fighting services, in agriculture or in industry. CURRAN and MALLINSON showed that among 100 neurotic sailors in hospital more than a third might have been spotted at the outset as liable to break down; and that these 100 men were more heavily loaded with psychopathic family history than a control group (45% as compared with 12%). Their findings should be useful to medical boards, especially if effect can be given to their plea for detailed psychiatric examination of men recognised, from initial history and psychological tests, to be doubtfully suitable. Medical boards presumably often reject men with some of the physical disabilities which CURRAN and MALLINSON list (arteriosclerosis, high blood-pressure, neurosyphilis) even when there is no evidence of mental disorder; but they will seldom be able to predict that minor affections—like defective vision or influenza—will cause a breakdown, unless other psychopathic criteria are present in such abundance as to justify rejection in any case.

The crux of the matter seems to be that you cannot reject all doubtful cases without also rejecting a relatively small number of men who are suitable as judged by their subsequent record. If the number of unsuitable men is high this loss is justified and even necessary, especially if pensions and other economic points must be considered. But it is doubtful whether our present knowledge justifies the drastic policy of rejecting all potential cases of neurotic breakdown at the stage of initial examination. CURRAN and MALLINSON advocate a more cautious policy: examine more carefully at this stage and eliminate the obviously unsuitable, some of whom still slip through; then watch the recruits during training—an admirable test for psychiatric invalids—and pick out the unsatisfactory ones as early as possible. Some of these will be brands to be plucked from the burning rather than Oedipuses to be cast out on the hillside. Skilled and tactful handling can make many of them into efficient members of a fighting service or fit for national work of some other kind. It must be borne in mind that a play-for-safety attitude in the doctor will favour the development of neurotic incapacity in the patients. The incentives to neurosis must not be increased by making it a well-known and respectable method of avoiding war or work; nor because there is no sign of this contagion at present must it be regarded as a negligible risk.

Rejection for military service should not mean that a man is left to find employment, irrespective of his own capacity and his country's needs. There is work here for the administrator who, with psychiatric and other medical advice, could plan suitable opportunities. Without such planning the psychiatrist can only tinker; with it he can both repair and prevent incapacity. Rehabilitation is only one element in a social scheme which should embrace a man's initial examination and placement, his treatment if he develops disability, his allocation (after breakdown or threat of breakdown) to appropriate military or civilian work and—if we can look so far—his incorporation in post-war society.

1. *Lancet*, Dec. 14, 1940, p. 738.

ALCOHOL, ANÆSTHESIA AND INFECTION

MANY experiments on animals have been done to show that acute alcoholic intoxication increases susceptibility to infection but few attempts have been made to explain the phenomenon. The pneumococcus has proved useful as a test organism in such experiments, and STILLMAN'S [1] work on inhalation-infection of alcoholised mice may be quoted as an example. He found that only 3% of normal mice exposed to a dense spray of pneumococci died of infection, compared with 40% of intoxicated animals. The only factor discovered in explanation of the increased susceptibility was that in the alcoholised mice removal of the inspired pneumococci from the lungs was delayed and blood-stream invasion was thus favoured. In partially immunised mice pneumonic lesions developed in a proportion of the alcoholised animals. An explanation of this depressant action of alcohol on the immunity-mechanism has lately been afforded by PICKRELL.[2] Using rabbits and the intradermal method of infection, PICKRELL found that immunised animals kept in a stuporose condition by the administration of 40 c.cm. of 20% ethyl alcohol by stomach-tube could be readily infected by the pneumococcus. These rabbits gave a positive blood-culture 9–10 hours after infection and died within 24 hours; control non-immunised and intoxicated non-immune animals developed bacteriæmia in 4 hours and died within 18 hours. The main difference between the normal and intoxicated rabbits lay in the character of the local reaction. Whereas large œdematous inflammatory lesions tracking bellywards developed in the normal animals, no macroscopic lesion was to be seen in the intoxicated beasts. When the skin was examined microscopically, in contrast to the dense leucocytic infiltration in the controls, there was hardly any emigration of leucocytes in the alcoholised animals, while bacteria were present locally in enormous masses. Similar results were obtained in animals kept under ether and Avertin anæsthesia. Other experiments proved that alcoholic intoxication does not impair the phagocytic activity or the motility

1. Stillman, E. G. *J. exp. Med.* 1924, **40**, 353. Stillman and Branch, A. *Ibid*, 1931, **54**, 623.
2. Pickrell, K. L. *Bull. Johns Hopk. Hosp.* 1938, **63**, 238; *Anesth. & Analges.* Sept.-Oct. 1940, p. 272.

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of the leucocytes or the "clearing" mechanism of the reticulo-endothelial system, and the loss of immunity was apparently due to the failure of the leucocytes to emigrate from the capillaries. It is not stated whether or not there was an intravascular leucocytosis, but there was no leucopenia.

The factor responsible for increased capillary permeability and leucocytic emigration in inflammation has been much studied by MENKIN who was able to isolate from inflammatory exudates a substance, "leukotaxine," which has a strong chemotactic action on polymorphonuclear leucocytes and which appears to be a polypeptide. DUTHIE and CHAIN [3] have shown that a polypeptide with similar properties can be obtained from peptic hydrolysates of blood fibrin and other proteins. Is it possible that alcohol and other anæsthetics interfere with the production or activity of this leukotaxine?

What are the practical implications? The danger of long narcosis in infected patients and the increased susceptibility of the intoxicated person to infection are at once suggested. It seems likely, too, that we have here an important factor in the genesis of post-operative pneumonia. FEATHERSTONE,[4] in an exhaustive analysis of the causes predisposing to this complication exonerated any particular form of anæsthetic or anæsthesia but showed that previous lung infection, the winter months and coincident epidemics, inhalation of infective material and possibly vitiated air were contributory factors. The condition was found to be most common after upper abdominal operations, possibly because reflex relaxation of the diaphragm allows a partial collapse of the lower lobes of the lungs. At that time local anæsthesia was not so much used, and it would be interesting to know if a local anæsthetic has any inhibitory effect on leucocytic emigration. Chest-surgeons are convinced that its use has lessened the risk of a flare-up of a tuberculous lung-lesion or of a secondary septic infection. And what of the chronic alcoholic? The carefully compiled statistics of CAPPS and COLEMAN [5] showed that in the same age-groups the fatality-rate from pneumonia was higher in the moderate drinker than in the abstainer, and higher still in the heavy drinker (the percentages in groups aged 30–39 years were 18·4, 29·1 and 42·5). There are indications, too, that the chronic alcoholic is more likely to catch pneumonia than is the normal person. What is the explanation? Is his immunity mechanism also upset and does he fail to develop a leucocytosis in response to infection? How do the alcoholic's tissues heal after operation? There are obvious opportunities for clinical research to see how far PICKRELL's animal experiments are applicable to human maladies.

OPHTHALMOPLEGIC MIGRAINE

THE association of ophthalmoplegic migraine with congenital aneurysms of the basal cerebral vessels has been recognised for some years. C. P. SYMONDS [6] described a case of ophthalmoplegic migraine terminating in a subarachnoid hæmorrhage in which a berry aneurysm at the junction of the internal carotid and posterior communicating arteries was found at autopsy. Since then several such cases have been recorded and the evidence suggests that many patients who complain of an intermittent unilateral headache associated with recurring oculomotor palsies have such an aneurysm on the circle of Willis or one of its branches. These aneurysms are often multiple, much more common than is generally supposed, and sometimes do not give rise to any symptoms at all. They are associated with a defect in the tunica media at the bifurcation of vessels and this can be found in arteries elsewhere in the body as well as in the cranium.[7] A. J. ADIE [8] noted that migraine is sometimes complicated by permanent homonymous hemianopia and other hemi-defects, usually on the left side, and that these permanent plegias may appear after an attack of migraine, after an unexplained loss of consciousness, or after some attack unlike either of these, such as a bout of dizziness. Patients with an exactly similar history of migraine with anomalous attacks and permanent palsies might, he found, have subarachnoid hæmorrhages, and in these he was prepared to diagnose the presence of a congenital cerebral aneurysm forthwith.

Ophthalmoplegic migraine due to aneurysm may mimic simple migraine for many years. The usual history encountered is that the subject, having complained of intermittent unilateral headaches of a migrainous type for some years, begins to notice that with the attacks of headache there is now ptosis, usually on the same side as the headache, or perhaps a diplopia or squint, or more than likely both. Each attack betokens oozing from the leaky vessel. Migraine from this cause usually begins earlier in life than does simple migraine and there is not such a clear-cut hereditary factor. After several attacks of oculomotor palsy which resolve, the paresis becomes more serious and ultimately permanent; some of the patients die of subarachnoid hæmorrhage. Any of the oculomotor nerves may be affected, and involvement of their central connexions has also been described, but the third cranial nerve is by far the most often attacked. A. J. ELLIOTT,[9] who has just described another example of the condition, discusses its ætiology. The suggestion that it is due to a transitory swelling of the pituitary body allied to angioneurotic œdema is ingenious, but has no evidence to support it. A similar mechanism was suggested by A. P. THOMPSON [10] to explain simple menstrual migraine in women; the migrainous attacks in such cases commonly cease during pregnancy so that there are grounds for supposing that the headaches occurring at the menses are associated with the œstrous cycle; and it is not inconceivable that they are evoked by transient enlargement of the active pituitary and tension in the sella turcica.

J. R. GRAHAM and A. G. WOLFF postulate [11] that the early phenomena of a simple migrainous attack—such as the scintillating scotoma, the monoplegias and the sensory changes—may be due to initial spasm of certain cerebral arteries; and they have demonstrated arterial dilatation of branches of the external carotid during attacks. This fits well with the opinion of ADIE who pointed out that cases of various types

3. Duthie, E. S. and Chain, E. *Brit. J. exp. Path.* 1939, **20**, 417.
4. Featherstone, H. *Brit. J. Surg.* 1924–25, **12**, 487.
5. Capps, C. A., Coleman, G. H. *J. Amer. med. Ass.* 1923, **80**, 750.
6. *Guy's Hosp. Rep.* April, 1923.
7. Nevin, S. and Williams, D. *Lancet*, 1937, **2**, 955.
8. *Lancet*, 1930, **2**, 237.
9. *Canad. med. Ass. J.* September, 1940, p. 242.
10. *Lancet*, 1932, **1**, 229.
11. *Arch. Neurol. Psychiat., Chicago*, 1938, **39**, 737.

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(migraine with ophthalmoplegia or other forms of paresis, epilepsy with similar signs, and subarachnoid hæmorrhage) might all seem at first sight to be due to leaky aneurysms; but that in actual fact in many of the young people dying from subarachnoid hæmorrhage no aneurysm was found. Cases without aneurysm he considered might be due to a recurring disturbance of the cerebral circulation, capable of giving rise to the whole range of symptoms and even to cerebral infarction and subarachnoid hæmorrhage. Thus the cause of the headache may be vascular in both simple and ophthalmoplegic migraine. It is worth noting that in two of ADIE'S cases cerebral aneurysm was associated with migraine and visual hallucinations without permanent ophthalmoplegia; in other words they had not reached a stage at which they could be distinguished from simple migraine. Knowledge of the normal and abnormal behaviour of the intracranial circulation has grown in the last few years, so that we may hope before long to find a rational therapeutic approach to a condition long treated symptomatically and empirically.

VERITOL

THE clinician, especially if he is a surgeon, pricks up his ears when a new sympatheticomimetic drug is mentioned, for anything that will combat shock and circulatory collapse is a boon to him. Thus the synthesis of adrenaline forty years ago by TAKAMINE was recognised as a landmark in the history of medicine. But the pattern of medical history is not unlike that of history in general. Enthusiasm for a new drug might be represented graphically by the curve of skew deviation: the discovery is hailed with acclamation, but sooner or later this fervency is tempered by a growing recognition of its limitations. Thus adrenaline rapidly fell into disfavour as a circulatory stimulant when the transient nature of its action was appreciated. The wailing wall, however, was never a popular institution among pharmacologists, and for them the synthesis of adrenaline, giving a clearer understanding of its chemical structure, opened a new field of investigation. Here was another opportunity to correlate the pharmacology of the cardiovascular system with the architecture of the adrenaline molecule and related substances. Research was not haphazard; it was guided by certain fundamental observations. GUNN[1] has pointed out that prolongation of the side chain of the adrenaline molecule by one CH_3 group increases the duration of the pressor effect, but at the same time diminishes the intensity of the action. Again the importance of the phenolic hydroxyl groups in the molecule was recognised as a means of increasing the intensity of the pressor action and simultaneously diminishing the stimulating effect of the drug on the central nervous system. That it might be possible, by the integration of these characteristics, to produce a valuable therapeutic agent became apparent from the study of ephedrine, which was isolated from the ancient drug ma huang as long ago as 1887.[2] Ephedrine has in fact found considerable clinical application in the treatment of shock and circulatory collapse. Among its advantages over adrenaline are its gentler and more sustained action on the blood-pressure, its stability, which makes it effective even when given by mouth, and its stimulating action on the vital centres. On the other side of the balance-sheet, however, are its delirifacient action, which may cause insomnia, and—more sinister if it is true—its tendency to produce myocardial degeneration if administered over a long period. The search for better compounds, therefore, can be readily justified on scientific grounds; it is not just a matter of painting the therapeutic lily. Accordingly, with one eye on adrenaline and the other on ephedrine the synthetic chemists a few years ago produced β-(*p*-oxyphenyl)-isopropylmethylamine, now known as Veritol. It is isomeric with ephedrine and differs from it only in the position of the OH group.

Veritol has been warmly recommended for combating acute hypotension associated with surgical shock, narcotic poisoning and infections such as diphtheria. There appears to be unanimity as to the low toxicity of the drug, and it is claimed to be superior to other related amines in that it raises the blood-pressure to a physiological level. Explanations of the cause of the pressor effect of veritol differ widely. REIS,[3] after commenting on this disagreement and reviewing experimental work on the problem, reports a series of investigations from which he concluded that "the rise of blood-pressure produced by veritol is due to two factors: (*a*) vasoconstriction, and (*b*) increased volume output per beat of the heart." From a clinical standpoint, however, veritol must stand or fall by how it compares with ephedrine, and literature on this aspect of the subject is scanty. KWIATKOWSKI[4] concludes that "the general tendency . . . to suggest that veritol has unique effects on the circulation which are quite different from those of related sympathomimetic drugs . . . are largely unfounded," and he can see no justification for considering veritol to be of special value in certain clinical disorders of the circulation. Veritol, KWIATKOWSKI points out, resembles ephedrine in preserving injected adrenaline from destruction and so increases its pressor activity; and on these theoretical considerations, as well as from the results of his own experimental work, he dismisses the suggestion that veritol raises the blood-pressure to some so-called physiological level. He expresses the view that the similarity of action of ephedrine and veritol in animals make it desirable that "a detailed reinvestigation should be made of their relative merits in the treatment of disturbance of the circulation." It now seems possible and even probable that this would bear out the truth of a statement made in one of our previous reviews of this circulatory stimulant,[5] that "experience has shown that physicians of the Continent tend to be unduly optimistic about the value of new drugs."

1. Gunn, J. A. *Brit. med. J.* 1939, **2**, 155.
2. May, P. and Dyson, G. M. The Chemistry of Synthetic Drugs, London, 1939, p. 161.
3. Reis, A. *Quart. J. exp. Physiol.* 1940, **30**, 1.
4. Kwiatkowski, H. *J. Pharmacol.* 1940, **69**, 198.
5. *Lancet*, 1938, **2**, 1069; 1939, **1**, 67.

Dr. John B. Youmans, associate professor of medicine and director of postgraduate instruction in the school of medicine of Vanderbilt University, has been granted leave of absence to serve with the health commission of the Rockefeller Foundation in Europe. The commission is to help France to re-establish and reorganise her health services and Dr. Youmans will be in charge of its work on nutrition.

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Annotations

THE BLEEDING TOOTH SOCKET

DENTAL hæmorrhage is more often a cross to the guiltless doctor than to the dentist who provoked it. By the time the patient has revolted against a mouth full of stringy clot, made up his mind that the bleeding isn't going to stop, or passed to the final conviction that he is about to bleed to death, the dentist has shut his surgery door and gone home. The doctor, however, is still at the end of the telephone. He usually performs his duty with that sense of grievance which clearing up after someone else is apt to provoke. Dr. D. Greer Walker [1] has given a reassuring summary of the conditions likely to cause dental bleeding, and the means of dealing with it. The common variety is, of course, caused primarily by trauma; a less common type, though primarily due to trauma, persists owing to abnormalities of the blood or vessels; very rarely dental hæmorrhage occurs spontaneously as a symptom of some other condition such as thrombocytopenic purpura. Hardly any of the so-called bleeders who give trouble after dental extractions are hæmophiliacs; generally the bleeding comes from a partially severed vessel. Walker divides his cases of bleeding into (*a*) immediate; (*b*) intermediate, where bleeding begins after an interval but within 24 hours of extraction, and may be due to such causes as a rise of blood-pressure following a general anæsthetic, slipping of a ligature, or the wearing off of the effects of adrenaline; and (*c*) remote, where bleeding begins after 24 hours and is caused by progressive sepsis. It is group (*b*) with which the doctor is too familiar.

In the ordinary case the wound should be carefully mopped out and examined, and if a bleeding-point is found an attempt should be made to pick it up with artery forceps and close it by gentle twisting. Failing this, a stitch through the free gum margins will often arrest hæmorrhage. If no bleeding-point is seen and there seems to be general oozing all round the gum margins, sustained pressure is usually effective; a small firm pad can be held in position by the finger or by the opposing teeth. Dental surgeons often make use of modelling composition for this purpose, shaping it so that when it is held in position by the teeth it presses on the margins of the wound. The patient is given a light meal before the composition is applied; as soon as it has been placed in position, the jaws are bound up with a four-tailed bandage until the following day. Some of this material would make a useful addition to the doctor's bag. Hæmostatics such as turpentine and perchloride of iron are rarely necessary, Dr. Walker finds, and he makes no mention of snake venom as a local application or substances such as Protagulin. Venom of the Russell viper in dilution of 1 in 10,000 has been found by many people to be effective in severe hæmorrhage. Simple methods of these kinds will suffice for most cases of immediate hæmorrhage due to trauma. Once the hæmorrhage has been checked Dr. Walker suggests that a full family history in respect of hæmorrhage should be taken, and a clinical history, including details of bruising, spontaneous or other bleeding from cuts or into joints, hæmaturia and menorrhagia. A record should be kept of the state of the mouth when first seen, and of important points in the dental history. A blood-count will decide whether any blood disorder is present; a differential white count will probably indicate the presence of leukæmia and a platelet count and a capillary-resistance test will help in the diagnosis of purpura. Bleeding and coagulation times are, he says, often misleading, and too much weight should not be attached to them.

1. *Brit. dent. J.* Nov. 15, 1940, p. 349.

LEAD ABSORPTION FROM BULLETS

LEAD poisoning as an occupational disease of soldiers and gangsters turns out to be no joke after all. Machle [1] has reviewed the 40 recorded cases of plumbism due to bullets embedded in the tissues—including the first one noted by Bronvin in 1867—and has added 2 more of his own. Cases are rare, and of those previously reported Machle concludes that only 3 fulfil all the present-day criteria for a diagnosis of lead poisoning; in 7 others the diagnosis was probably correct and a further 13 showed signs of lead absorption, such as a blue line on the gums and punctate basophilia, signs which may be found without other clinical or chemical evidence of poisoning. It appears that if the bullets are lodged in bones near joints lead poisoning is much more likely to develop than when the bullets are in other tissues such as muscle. In both of Machle's cases the bullets were found in bones near joints. One, a man of 27, had carried a bullet in the head of the right femur for 6 or 7 years; he had not been well in the interval and his symptoms, such as dizziness, headache and malaise, had become increasingly severe. Radiography showed that some absorption and local dissemination of lead from the bullet had taken place. The amounts of lead in the urine and blood were found to be higher than normal, and after removal of the bullet the concentration of lead became progressively less over a period of 10 weeks. A portion of the joint capsule on chemical analysis was found to contain more than 3% of lead. It is not stated whether the symptoms decreased concurrently with the fall of the lead content in the body. The second patient had a pistol bullet in the right wrist resulting in deformity, but there were no general symptoms pointing to lead poisoning. The bullet was not removed and radiography showed that solution of the lead began 7 weeks after the bullet was lodged in the wrist. Another film 5 years later showed that more lead had been dissolved and deposited in the surrounding tissues. The concentrations of lead in the blood and urine were higher than normal, but no mention is made of signs and symptoms of progressive poisoning in this case, and on the evidence given it cannot be accepted as proven; Machle has not applied to it his criteria of diagnosis as strictly as he has done to those reported by others.

GASTRIC TONUS

Dr. Ff. Roberts [2] deprecates the radiological classification of stomachs into "hypertonic, orthotonic and hypotonic." He quotes the classical experiments on tonus in smooth muscle, and upholds Bayliss's definition of it as the property of remaining in a state of moderate contraction which is independent of any influence from the nervous centres, though capable of augmentation or diminution by the central nervous system. Tonus is clinically of importance in that smooth muscle, particularly in the walls of a hollow organ, does not fulfil its function unless it adapts its length to prevailing requirements—for example, to the degree of fullness of the organ. The contents of a full stomach should be held at approximately the same tension as those of a half-empty stomach. The organ does not stretch like a toy balloon as it is filled, it expands—to use Dr. Roberts's apt simile—more like a Revelation suitcase. How this is brought about is a mystery; thus shortening of the smooth muscle does not seem to be adequately described by the familiar term "contraction" which connotes a burst of activity accompanied by the consumption of energy. The muscle merely adopts a new "normal" length which it maintains without effort. Contractions are superimposed.

However obscure the physiological nature of the process, tonus is a delightfully expressive word with which to cloak our ignorance, and as we are unlikely to

1. Machle, W. *J. Amer. med. Ass.* Nov. 2, 1940, p. 1536.
2. *Brit. J. Radiol.* December, 1940, p. 248.

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find a better, we should respect it. "Hypertonic" and "hypotonic" stomachs should mean definitely abnormal stomachs, the former displaying an immoderate degree of tonic contraction, and the latter failing to show enough. The only satisfactory criterion would be the intragastric pressure, which would snatch the word tonus from the lips of radiologists altogether. Perhaps it is unfair to push the argument this far, but however the term is misused, Dr. Roberts is right in drawing the line at using it to describe mere anatomical shapes. He assures us on excellent authority, and we have heard before, that the so-called hypertonic, hypotonic and orthotonic "types" of stomach are in fact varieties of the normal which deal equally faithfully with their contents, and exert on them the same pressure.

TREATMENT OF APLASTIC ANÆMIA

IN the successful campaign that has been pursued against the blood diseases since 1926 certain islands of resistance have remained unconquered, and doctors of the utmost fame have had to answer "as they took their fees, There is no cure for this disease; Henry will very soon be dead." Few blood diseases have been more resistant than primary aplastic anæmia. It has been argued that, since the commonest cause of anæmia is deficiency of one or more of the factors needed to ensure the proper formation of red cells from primitive erythroblasts, aplastic anæmia is possibly due to deficiency of some factor responsible, say, for the development of the primitive precursors of red cells, granular white cells and platelets from reticulo-endothelial cells. This theory has been put into practice by giving various hæmatinic substances, such as combinations of liver, iron, and nucleotide or nuclein, but these measures were without success. The deficiency supporters next thought that perhaps the factor resided in healthy marrow and was absent from aplastic marrow; consequently yellow bone-marrow and extracts of yellow bone-marrow have been administered, but again the results have been unconvincing. Morrison and Samwick[1] now suggest that it is the point d'appui of the missing factors that is at fault; the hypothetical factor in the marrow should not be trusted to the blood-stream but deposited at the scene of action—the marrow. They describe a patient with typical aplastic anæmia whom they treated by injecting directly into the sternal marrow space some fresh marrow fluid withdrawn from a healthy donor. The healthy marrow is obtained by aspiration from a sternal puncture, not more than 5 c.cm. being withdrawn at any one time, and injected at once down a sternal-puncture needle already in place in the patient's sternum. A total of 13 c.cm. was injected into their patient over three days, and he recovered in spite of the fact that he had reached that hæmorrhagic phase which usually indicates that the end is not far off. Morrison and Samwick give the credit to the "marrow-transfusion," but unfortunately the evidence is not clear. The patient had also received by the normal routes blood-transfusions, liver extract, pentnucleotide and sulphanilamide. Transfusions have been known to tide patients over awkward periods until spontaneous remission takes place, and Rhoads[2] says that no marrow seems to be so aplastic that it may not recover. The rationale of marrow-transfusion is also not clear; even if the transfused marrow does stimulate the sternal marrow to activity, this is a relatively insignificant fraction of the total marrow; and if the "factor" is to stimulate the rest of the marrow it can presumably only get there via the blood-stream, in which case the trouble of marrow-transfusion seems unnecessary. Nevertheless this work draws attention again to the possibility of marrow factors, and healthy active marrow certainly seems a more promising site for them than inactive yellow marrow.

1. Morrison, M. and Samwick, A. A. *J. Amer. med. Ass.* Nov. 16, 1940, p. 1708.
2. Rhoads, C. P. Symposium on the blood and blood-forming organs, Madison, 1939, p. 31.

THE ACHOLURIC INFANT

HÆMOLYTIC anæmia in infants is commonly known in this country as acholuric jaundice, but has other aliases such as splenomegalic icterus, congenital family cholæmia, congenital hæmolytic icterus, congenital hæmolytic anæmia and congenital hæmolytic disease. It is characterised by an increased fragility of the red cells and is rarely discovered in early life, although presumably the abnormal state of the blood is there at birth. A. F. Abt in reporting[1] three cases in infants suggests that more cases will be diagnosed at an early age in the future, and his description of the disorder in the very young should help to make this possible. In one of his three patients symptoms were first noticed at birth and in the others at 4 months of age; in two the onset was insidious and in the other a severe crisis occurred at the onset. No familial history was present in any of the cases. Anæmia rather than jaundice is said to be a feature of the disease in the young and in one this was striking; the red cells numbered only 790,000 per c.mm. Jaundice, however, though slight, was present in all, and bile-pigment was increased in the blood. Abt emphasises certain variations in the blood picture which distinguish hæmolytic anæmia in the infant; macrocytosis may be found instead of the more usual microcytosis and was present in two out of the three cases reported; considerable reticulocytosis occurs, averaging 25–35% in Abt's cases; and the fragility of the red cells is not absolutely typical—in one only was there a decreased resistance to hypotonic salt solution, in one resistance was normal, and in the other resistance was actually increased. The spleen and liver were enlarged in all three. Febrile and hæmolytic crises occurred, in one infant every three weeks; in one every three months; the third had a single severe crisis. Abt points out that the only permanently successful therapy is splenectomy. This has been carried out in two of the infants with good effect. The best temporary treatment after a crisis is transfusion, and frequent small transfusions over a period of several weeks were used in one of his cases. He insists that the operating surgeon must search for accessory splenic tissue. The life of infants with hæmolytic anæmia depends on early recognition of the disease and splenectomy.

CONTROL OF DRUG TRAFFIC

THE latest report of the advisory committee on traffic in opium and other dangerous drugs does not suggest that this beneficent work of the League of Nations is to be curtailed or suspended owing to the war. Indeed it justly declares that it is "only by maintaining both the national and international systems of control that it will be possible to prevent a return to the situation which prevailed between 1921 and 1929." The last war led to a recrudescence of drug addiction and of illicit traffic, and the committee urge that this bitter lesson of experience must not be lost sight of. But the projected conference on the limitation of cultivation of the opium poppy and the production of raw opium is again postponed, although this problem is fundamental to effective control of the traffic. The Permanent Central Opium Board and the supervisory body under the convention of 1931 are at one with the advisory committee on the necessity of enforcing the existing conventions limiting narcotic drugs to medicinal and scientific purposes. The representative of China reported progress with the six-year policy of abolishing poppy-growing and said that opium would no longer be produced in unoccupied China. He alleged that the Japanese are systematically

1. *Amer. J. Dis. Child.* October, 1940, p. 812.

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encouraging poppy-growing and the abuse of narcotic drugs in the territory under their occupation. It was stated that in Nanking, where an opium monopoly has been established, there are 60,000 addicts, and narcotics form the chief source of revenue of the government installed by the Japanese. The figures for 1938 show that the world manufacture and consumption of the five principal drugs corresponds to its legitimate requirements —42·7 tons of morphine, 611 kg. of heroin, 27·5 tons of codeine, 2·5 tons of ethyl morphine, and 3·8 tons of cocaine. The advisory committee discussed at length the creation by the assembly of the League of a central committee for economic and social questions to unite and supervise all the technical activities of the League. Apprehension was felt by some members of the committee lest its duties should be subordinated to the new central committee and that its direct responsibility to the council of the League for the several international opium conventions should be jeopardised. It was resolved to make representations to the council urging that the technical independence of the advisory committee should be maintained.

TESTING STERILITY OF DRESSINGS

PERIODICALLY in any hospital with surgical wards the bacteriologist is asked to test the sterility of dressings, usually because of a sudden increased prevalence in septic operation-wounds, and because the surgeon, satisfied that his technique is beyond reproach, must find a scapegoat. The circumstances of testing dressings bacteriologically—the need for wide-mouthed containers and the manipulation of large pieces of gauze—make accidental contamination very difficult to avoid, so that the bacteriologist may have to report that the dressings were not, according to his tests, sterile and the surgeon feels justified. To forestall such happenings it is essential that the sterilisation of surgical dressings should be under laboratory supervision so that the bacteriologist can at regular—and irregular—intervals test the efficiency of the steriliser by some recognised method; his services are likely to be in demand now that Hayes[1] has demonstrated that the sterilising technique in common use may leave tetanus spores unharmed. Chemical tests with colour changes are not reliable. Dry earth or the spores of *Bacillus subtilis* in a sealed packet or test-tube wrapped inside a packet of dressings affords a reliable means of ensuring complete sterilisation, since the spores of pathogenic bacteria—e.g., *Clostridium welchii* and *Cl. tetani*—likely to be present in dressings are much less resistant than are those of the hay bacillus, which are usually killed by a pressure of 16–20 lb. (122–126° C.) for 15–20 minutes in a large steam steriliser. If, however, bacteriological tests are not being regularly done, and it is a question of testing the sterility of the actual dressings, the difficulties of avoiding accidental contamination must be realised both by the bacteriologist and the surgeon. Savage[2] has analysed the factors —size and type of dressings, time taken in manipulation and exposure, dustiness of wrapping and electric charge —which may favour a laboratory contamination, and as a result of his findings recommends that a uniform technique should be adopted. The area of the gauze used for each test should be 4 sq. cm., and undue hurry in manipulation must be avoided because air currents may carry bacteria into the culture-tube. A series of tests (say 10) should be done, and if a proportion (say 6) of these are sterile, sterilisation has been satisfactory. He advises a control series of tests from dressings known to be sterile. The chance of partially sterilised dressings slipping through this test is small. Slow rate of growth and purity of culture in positive tubes suggest accidental contamination. Savage does not recommend any particular medium, except that it be liquid; sloppy nutrient agar (0·1% agar) with 0·5% glucose in wide-mouthed screw-cap containers is perhaps the best.

1. Hayes, S. N. *Brit. med. J.* Dec. 14, 1940, p. 825.
2. Savage, R. M. *Quart. J. Pharm.* July–September, 1940, p. 237.

A CURE FOR CRAMP

ONE of the most difficult complaints to relieve is what is known as night cramps, which affect the lower limbs at rest. The middle-aged or elderly patients who suffer from them often show no clinical evidence of peripheral vascular disease, and the pains are presumed to be due to tonic spasms of the muscles. They may or may not be associated with intermittent claudication. On one view the spasms are akin to tetany and are produced by alkalosis, and relief has been recorded[1] from breathing in and out of a bag to cause retention of carbon dioxide. Usually, however, the cramps prove resistant to any form of therapy short of opiates. Moss and Herrmann[2] have lately reported success with quinine sulphate. This treatment was first suggested by Wolf and Kennedy's[3] work on the effect of quinine hydrochloride on skeletal muscles in myotonia congenita and myotonia atrophica, which has since been confirmed by various workers, including Briscoe.[4] It is now fairly certain that quinine acts at the myoneural junction as the antagonist of prostigmine, thus relieving spasm in the myotonias. In all the fifteen cases on which their report is based Moss and Herrmann obtained relief of symptoms by giving gr. 3 of quinine sulphate twice or thrice daily. Only four cases are reported in detail, but in all of these the occasional substitution of a placebo was always followed by an exacerbation of symptoms. They say, however, that in others of their series the symptoms did not return when the quinine was stopped. Quinine sulphate had no effect on the intermittent claudication in patients who had this as well as cramp at rest.

NEW GOVERNMENT POWERS

THE Minister of Health has decided that the final responsibility of deciding whether children are to be evacuated or stay at home must continue to rest with their parents. But he has made one important exception. He has issued a new order under which any child thought to be suffering, or to be in such a state of health as to be likely to suffer, in body or mind as a result of war conditions can be compelled to be examined by a doctor. If after examination a child is found to be suffering or likely to suffer, its removal under the Government evacuation scheme from the dangerous area will be made compulsory. The parents will have the right to appeal to a court of summary jurisdiction. But if no appeal is made or if the appeal is rejected they will be liable to prosecution unless the order is obeyed. At present the order, which does not apply to Scotland, will only be enforced in the London evacuation area. The health of the children who remain must also be protected and, as a headmaster points out on another page, children who live in shelters have other dangers than bombs to face. To protect them the Government has arranged for the medical inspection of all children in shelters, so that their general health may be watched, diseases spotted in their early stages, and medical advice given directly to parents. The Government has also taken powers to compel any person visiting a public shelter who is thought to be suffering from an infectious disease or infested with vermin to be medically examined, and to insist on their isolation, removal to hospital, or cleansing as may be necessary. Medical inspections in schools have played an important part in improving the health of the nation. Perhaps it is now the turn of medical inspections in shelters to do their share.

1. Fitz, A. W. see *Lancet*, 1927, **1**, 403.
2. Moss, H. K. and Herrmann, L. G. *J. Amer. med. Ass.* Oct. 19, 1940, p. 1358.
3. Wolf, A. *Arch. Neurol. Psychiat.* 1936, **36**, 382; Kennedy, F. and Wolf, *Ibid*, 1937, **37**, 68.
4. Briscoe, G. *Lancet*, 1939, **1**, 1151.

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Special Articles

DIPHTHERIA CONTROL IN SCOTLAND

THE scientific committee which advises the Department of Health for Scotland on the application of established knowledge to public-health administration consider that on the medical evidence it is almost certain that diphtheria can be removed from the list of killing diseases, and if at least three-quarters of the child population can be immunised one of the most serious dangers to child life and health will have been removed. Today the need is especially urgent and on their recommendation a nation-wide scheme for the immunisation of preschool and school-children has been put into effect. Their subcommittee on infectious diseases have lately reviewed practical experience already gained in Scotland and in their report they make the following points:

Number of children immunised.—The highest proportion of children immunised has been in the county of Aberdeen (see table I), and even there a considerable

TABLE I—PROPORTION OF CHILDREN IMMUNISED

—	Under 5 years		From 5 to 14 years	
	Estimated total (1938)	Immunised	Estimated total (1938)	Immunised
Edinburgh ..	34,875	2800	71,579	17,200
Dundee	15,300	434	30,750	372
Aberdeen County (1935-37) ..	12,600	3254	22,750	16,334
Aberdeen City (1936–38) ..	14,100	873	25,468	3615
Ayr County (to 1939)	19,500	2896	39,000	15,353

residue of non-immunised children remains as a reservoir of infection sufficiently large to prevent the diphtheria-incidence and death-rates from showing a dramatic fall. In the cities, the proportion of children immunised is so small that the benefits are presumably only to individuals and not to the population as a whole.

Parental consent.—Provided that active propaganda is undertaken, there is no difficulty in securing parental consent. During 1935–37 in Aberdeenshire, nearly 80% of the parents agreed to immunisation. In the city of Aberdeen for 1936–38 the proportion of consents was relatively low, owing to the social type of the families in particular districts, and to the greater interest taken in immunisation by parents in rural districts. But where the usual channels of publicity are fully used there will usually be at least 80% compliance on the part of parents.

Susceptibility.—It has been found that children under 8 are almost all susceptible to diphtheria—that is, they have a positive Schick reaction. The use of the Schick reaction at these ages has therefore been dispensed with, but in older children it is still used. The two chief reasons are: (1) by this age an appreciable number of children, especially in towns, have acquired immunity to the disease; (2) the immunisation procedure used for these older children is rather more expensive and tedious, in order to avoid local and general reactions. Of the children tested in Aberdeenshire in 1935–37 21% were immune (Schick-negative).

Age at immunisation.—Within limits, the younger a child is immunised the better. Most of the schemes at present in operation draw the children mainly from the group of school-entrants. It is preferable to draw from the preschool group of children, omitting those below the age of a year, though it is difficult to make contact with the parents of this group. But a scheme which is mainly for school-children fails to protect those who are in the susceptible age-groups.

Methods used.—For children under 8 the best method for producing good, lasting immunity is the injection of two doses of alum-precipitated toxoid at an interval of one month. Aberdeen county and city have in the past relied on a one-dose method, which does not always produce an immunity of sufficient degree and permanence. The immunity produced by two injections lasts often for years, and can be readily brought to its original intensity by giving one more dose. Children immunised in the preschool period may have this additional dose on entry to school; and periodical Schick testing in later years, with the administration if necessary of further doses, will ensure the maintenance of a high level of immunity. At the age of 8 and upwards, alum-precipitated toxoid causes occasional inconvenient reactions, and toxoid-antitoxin floccules which do not give rise to these reactions are substituted. They are given in three doses, usually at intervals of two weeks. The immunity produced by three doses of the floccules is of high intensity and long-lasting.

Medical staff.—The success of immunisation in Aberdeenshire is due mainly to the fact that a medical officer is assigned to this work only. He has the responsibility of undertaking propaganda, performing immunisation and entering up the records. With a suitable and enthusiastic officer the scheme is energised and rendered more complete; and the success of a scheme of this nature is dependent on the size of the non-immunised residue. The appointment of full-time officers is of primary importance. It is not essential that all the work should be done by these officers, and part-time officers may help, but the full-time officer is the central point of the scheme, and he can best supply the continuity and concentration necessary to maintain the scheme when the first flood of enthusiasm has subsided. The number of full-time officers required depends on the population and the ease of access to the children. Rural areas will require proportionately larger staffing than urban areas. Glasgow, with a population of about 1,130,000, for instance, would need at least 8 full-time officers.

Institutions used.—If diphtheria immunisation is to be re-orientated so as to protect the preschool children the use of schools will probably form only a part of the scheme. Places where children can be treated in groups will prove to be the most useful, and children's homes, nursery-schools, day-nurseries, toddlers' playgrounds, isolation hospitals and child-welfare clinics should provide a nucleus of institutions round which schemes can be built. Especially at child-welfare clinics, which are often in use only for some hours each week, routine immunisation clinics may be established for children from the age of 1 year upwards.

Results.—In 1935, of the children in Aberdeen county who were originally susceptible, immunisation converted susceptibility into immunity in 93%. In table II the attack-rate of diphtheria in immunised and in non-immunised children is compared, and the death-rates and case-fatality rates are also shown. It is difficult to assess

TABLE II—RESULTS OF IMMUNISATION

	Cases of diphtheria		Attack-rate (per 1000)		No. of deaths		Yearly death-rate (per 1000)		Case-fatality rate (%)	
	Non-im.	Im.	Non-im.	Im.	Non-im.	Im.	Non-im.	Im.	Non-im.	Im.
Aberdeen Co. (1935-37)* ..	1108	52	25·1	2·6	53	1	0·5	0·02	4·8	1·9
Aberdeen City † (1936–38) ..	328	15	15	4	8	0	0·24	0	2·4	0
Ayr County ‡ (1939) ..	314	32	8·4	2	14	0	0·4	0	4·5	0

* Children of all ages (corrected up to age 20 for 1937).
† Children aged 5–14. ‡ Children aged 0–14.

the exact significance of the figures because the constitution of the age-groups to which they apply is constantly changing. A child who is immunised at the age of 3 or 4 soon becomes a child in the school-age group. The same considerations, of course, apply to non-immunised children.

General finance.—In an average year there are about 10,000 cases of diphtheria in Scotland; each patient stays in hospital usually for over 30 days, at an average daily cost of at least 7*s.* 6*d.* The total yearly bill may be roughly estimated at well over £100,000; which does not include the incalculable items of about 400 deaths each

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year and the prolonged disability of many who do not die. The cost of immunisation is estimated at 1s. per head.

In summing up the committee recommend that diphtheria immunisation should be made available as part of the general public-health measures in Scotland to all children over the age of 1 and especially to those under the age of 5. Between these ages the vast majority of children, whether living in town or country, are susceptible to diphtheria. To obtain the maximal efficiency in administration and execution of diphtheria-immunisation schemes, they should be carried out principally by full-time officers who are not engaged in any other work and who should have the prospect of employment as members of the public-health services. Young children should be given two doses of alum-precipitated toxoid at an interval of not less than one month. The level of immunity should be maintained by later injection of one dose of a suitable preparation, if necessary after Schick testing, when the child enters school and at intervals afterwards. No scheme should be approved which does not make provision for regular re-immunisation. In the initial stages of a universal diphtheria-immunisation scheme older children should be immunised, if necessary after the determination of the Schick reaction. This will avoid leaving a reservoir of infection in the older age-groups. Children of 8 years or over should be immunised with three doses of toxoid-antitoxin floccules at two-week intervals.

Sir Alexander Russell, M.D. has been appointed by the Department of Health to lead the campaign and the figures which are coming in show an encouraging response. For instance during Edinburgh's first week of intensive effort 5081 children were immunised.

WAR STRAIN

A DEBATE AT THE TAVISTOCK CLINIC

Two recent Sunday afternoons at the Tavistock Clinic were devoted to a discussion on war strain: its manifestations and treatment. The chair was taken by (1) Colonel J. R. REES and (2) Dr. JANE SUTTIE.

Dr. HENRY L. WILSON said that the London Hospital neurological department had received from 50–70 cases a week since September 1939 and the first-aid post had dealt with over 500 patients since September 1940. Among these people there had at first been a good deal of cardiac disorder due to the early raid warnings; this had rapidly recovered. Strain was indicated by the rapid rise in peptic ulcer and perforation in September of both years. Before January 1940 there had been three types of war disturbance: (1) intensification of symptoms in old hysterics; (2) serious hysterical disorders in the "compulsive religicos," deprived by the blackout of their pseudo-theological escapes in little East End bethels; and (3) reactive depressions in those threatened with loss of loved ones. These cases might have been much more numerous but for the weekly visit to evacuated relatives. In the spring, stability had returned, but the fall of Norway and France had ushered in a series of acute anxiety states: cardiac, gastric and respiratory in type. Most cases were relieved by open discussion of war anxiety; often they had been trying too hard to be brave. The serious bombing might have had incalculable effects if there had not been adequate deep shelter. The symptoms of long-standing hysteria were intensified, together with a conscious indifference, and the patients showed the exhibitionist element in their malady by their tales of alarm or damage. Mothers showed increased alarm about their children; but patients on the way to recovery from anxiety states were gratifyingly able to discuss the practical dangers. A number of transient pareses, thoracic pains and sensory losses had occurred, but had responded to persuasion before and after a mild sedative and a night's sleep. A few cases of mild hyperventilation and hysteric contracture had proved very amenable to hypnotic suggestion, but one or two chronic asthmas had been quite inaccessible. Some patients with hysterical tremors had been in such a state of anxiety that hypnosis could not be produced; they had been given intramuscular Luminal and hyoscine, together with suggestion. Of 35 old patients whom he had known fairly well before the war, eight had been evacuated; seven were "chronics," moderately indifferent to disaster and concerned only with their own troubles; four were approachable hysterics with somatic pain, and these were doing well and recognising that their pains were associated with fear; two serious hysterics were worse; five male anxiety-states were carrying on satisfactorily; and five obsessional patients were either better, or better with lapses.

Some young men who had joined the A.F.S. or A.R.P. to escape conscription or to earn a living had presented cardiac and gastro-intestinal reactions to strain they were really not fitted to face. If the symptoms had been present for three weeks before treatment began the prognosis was poor. A few bombed people had repressed their emotion very badly, but had responded well to persuasion, hypnotic suggestion and adequate sleep.

The Friends Ambulance Unit working in Stepney shelters recorded a small number of neurotic disturbances requiring instant attention. Valuable prophylactic work was done by stimulating aggressive impulses and day dreams and preventing gloom. Under shelter conditions the ego ideal was modified and people did not have to maintain a standard of behaviour at the expense of conflicting emotions.

Dr. H. V. DICKS said that the cases received in his base hospital were of the types ordinarily seen in the last war, and the pre-bombing neuroses were of the peace-time pattern. Conversion hysteria was the commonest; followed by anxiety; terror coupled with the effects of fatigue, blast or concussion; and depression. Of 27 "civilian casualties," fourteen had had a fairly bad history and a further six a really bad past, but the remaining seven had needed considerable trauma to break them down. The simple terror cases had all been in women, more or less affected by blast, and all had cleared up quickly. The neurotic population in hospital had shown only slight reactions to the war. A certain amount of noise and raid activity had acted on many people like a graduated dose of vaccine. The first requirement in treatment was the administration of sedatives until the sense of security had been re-established; baths and massage were useful, and detoxication should be carried out where indicated. Abreaction of fear had great value, and in some instances Evipan hypnosis was a useful technique; abreaction occurred when the patient awoke from the evipan sleep. Depressed cases did best under some form of continuous sleep therapy. The best hospital for these patients was one not too remote from air-raid noises, where their attitude to anxiety could be reconstructed. People with serious breakdowns should be sent to safe areas. Children did well on mild psychotherapy.

Dr. SUTTIE, summarising the previous discussion, said that remarkable unanimity had been shown. Whenever war experiences had succeeded in breaking down anti-social attitudes, but had also released repressed social feeling and emotionally inhibited capacity, these neuroses had been submerged or even completely cured, and sufficiently tough community feeling and enjoyment of effort had been mobilised. When the patients were already too deeply absorbed in their own private mental conflict, the external conflict either went unheeded or else became a catastrophic ally of the morbid state, precipitating and exaggerating various anxiety manifestations. The "over-moralised" personality, the obsessional, did well unless their too rigid emotional technique for living was too far tested. Relatively normal people "shocked" by massive trauma reacted rapidly to reassurance, security and measures ensuring sleep. The important point was that these measures should be applied as soon after the trauma as possible, and the patient returned to his normal work and conditions. Aphonias and fugues seemed to have been met only in the services.

Two striking impressions emerged: first, war strain in civilians had not presented anything which did not find its place in the framework of existing knowledge. This was not dull, but very thrilling; it meant that psychotherapists could face the effects of war without fear. Secondly, war demonstrated the value to society of a much freer flow of emotional contacts between human beings both "horizontally" and "vertically" in the social structure. The psychotherapeutic value of feeling

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well-knit into society was a factor which the individualistic Britons would have to consider very seriously. Social reconstruction was going to be even more important than architectural reconstruction, and would be affected by experiences in shelters; it would be inextricably bound up with neurosis.

Dr. Suttie then described how some of her patients had reacted; a suicidal man had improved enormously; an acutely anxious woman had had her anxiety increased beyond bounds but at the same time her power of enduring it had increased.

Dr. WILSON observed that deeply exhausted people must be sent away from work and ensured adequate sleep. He felt he was on the edge of a precipice with many patients: anticipating an acute reaction with which he would be unable to cope. A large amount of anxiety might in some cases have to be stimulated before the patient could react in a more adult way. Perhaps civilians less often showed amnesias, aphonias and fugues than service patients because of the support given by doctors and psychotherapists; in the services the display of anxiety was not permitted, and emotional contact was very difficult.

Dr. DICKS said there were some civilian cases of amnesia and fugue. One case of fugue in a soldier had been due to acute fed-upness in the absence of any fear-stimuli, but in general he agreed with Dr. Wilson on this matter. Possibly low I.Q. was associated with extreme reactions. In the last war a neurotic breakdown for the soldier had meant removal to complete safety, but in this war there was no safety anywhere. He thought there was some stimulus to homosexuality; the repressed type was more likely to get into trouble under war conditions, reacting by intense defence mechanisms such as anxiety or paranoia.

Dr. ALICE HUTCHINSON had seen three different reactions in one patient: during the Munich crisis she had seemed quite unaware of any international situation; at the outbreak of war she had shown panic anxiety like a frightened child. Then she had lost her job, taken up Red Cross work and left her little room. She had had severe experiences in the blitzkrieg but, though frightened, had managed to carry on. If she had not had treatment throughout she would probably have withdrawn into a psychotic state.

Dr. J. WHITBY, describing general practice in north-west London, said he had found 5% develop mild symptoms of anxiety, and the majority recovered very rapidly.

Dr. GEORGE PEGGE said that the clinical material at St. Mary's Hospital was selected in that it all came in by ambulance. The commonest symptom was amnesia; perhaps this would clear up spontaneously in some cases. The milder, conscious, very shaken cases showed some amnesia for the period just before the incident, in more severe cases there was collapse with low blood pressure, merging into the case more legitimately called "shock." The next most common type was tremor so violent that walking was impossible. He segregated them quickly and tried to restore full consciousness; persuasion at the conscious level was often enough. When memory returned within an hour or so it was not overloaded with anxiety as in later anamnesia. Unconscious patients were talked to just as if they had been therapeutically hypnotised; explaining the mechanism of their condition and urging return to consciousness. After about ten minutes they were told to wake up and give their name and address. This was so successful as to be almost diagnostic in distinguishing them from cases of concussion. Other hospitals did not seem to recognise this type of case; perhaps they were classed as concussion and left alone; they then probably appeared later as frank neurotics. If there was residual amnesia they were given a sleeping draught and then a hypnagogic command to remember when they awoke; this worked very well, even when the amnesic gap was six months a year. They were kept in hospital one night or three nights, and if not recovered, were sent on. Of the first 27 cases six had been successfully treated in one night, ten in three nights, and eleven had been sent to a base hospital. Psychological cases had been one-seventh of the total casualties received. He doubted very much whether it was satisfactory to send back to London patients who had been treated elsewhere.

Dr. DICKS said that his cases of amnesia had been persistent after some time and often after such "first-aid methods"; it was possible that the transient amnesia was due to physiological conditions.

Dr. MICHAEL LEAHY had found that suggestion with and without hypnosis was very useful. He saw good reason to believe that strain was severe in people who were carrying on; their thoughts were doing them damage. He treated them by saying he might be able to alter their reactions to bad facts, as a dentist would replace a bad tooth. He described himself as a merchant who dealt in thoughts, and introduced them to the working of the subconscious mind. He gave suggestions, and wrote them down, telling the patient to read them over when he went to bed.

Dr. M. BARDEN said that at a Middlesex mental hospital there had been no noticeable increase of admissions since the blitzkrieg and a marked fall in November. Of the 71 admitted during September, October and November, in only nine was there any traceable relationship between trauma and symptoms. There was no special air-raid psychosis—just the usual types well known to psychiatrists. He thought the emptiness and misery that would come into people's lives when the war was over would be a serious problem.

Dr. AUGUSTA BONNARD suggested research into the reasons why people had joined rescue services: because they had lost their jobs, or to evade military service? She had been struck by the much greater incidence of neurosis among these services; they also suffered from having neither the honour of the soldier nor the pay of the munition worker, and had no one to look after their welfare, hours of work, meals and so on. The research might use the regular police as a control.

Dr. SUTTIE thought the war had acted as a father figure—a tremendous masculine figure which emotionally had a valuable curative effect on the mother-determined patient, such as the anorexia nervosa. The significant fact that emerged that afternoon was the need for communication of feelings. It was lamentable that society had found a use for so many only in time of war. This question of articulateness was very important: of learning one's capacities and how to apply them.

IMMUNISATION AGAINST VIRUS AND RICKETTSIAL DISEASES

Being an abstract of the third Harben lecture delivered at the Royal Institute of Public Health and Hygiene on Dec. 11 by Lieut.-Col. H. J. BENSTED, M.C., M.R.C.S.

A NATURAL attack of some virus diseases gives a lasting solid immunity; with others an attack confers little or no protection against a subsequent infection. Convalescent sera from recovered cases, and artificially prepared anti-sera have been employed as prophylactics in virus diseases but have only a limited application; and suspensions of live, attenuated, or killed viruses have been used to induce active immunity.

SMALLPOX

At present, thanks to the administration of previous generations, smallpox is rare in this country and the native virus appears to have lost much of its virulence; but when a foreign virus is imported, for instance from the East, severe and fatal cases are still seen. Propaganda against vaccination has produced a false sense of security and large numbers of parents refuse to accept protection for their children. The consequence is a population of young adults with a dangerously low protection-rate.

The stock virus used for propagation through calves tends to lose potency after long-continued passage through the same species and is therefore subjected to occasional passage through rabbits. After the lymph has been collected the calves are killed and subjected to autopsy. Lymph from any diseased animal is rejected. The lymph is mixed with four times its weight of 50% alkalinised glycerin; it then contains about 4000 bacteria per mg. These bacteria—mainly staphylococci, *Bacillus subtilis*, moulds, and yeasts—are mostly destroyed

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during storage at −11° C.; after about six months their number has fallen to about 5 per mg. The lymph is then suitable for use. Before being issued it is tested for the presence of hæmolytic streptococci, gas-forming anaerobes and other pathogenic bacteria. It may be stored at low temperatures for long periods without losing its potency.

Intracutaneous injection is not without danger because the lymph is not absolutely free from bacteria. Nowadays it is customary to make the inoculation at a single scratch instead of scarifying in the time-honoured manner. There is evidence that there are advantages in using a pure tissue culture of the vaccinia virus for intradermal inoculation. The virus is cultured on the chorio-allantois of a fertile egg, the method being a simple one. The vaccine produced is free from contaminating bacteria and can be inoculated intradermally without danger. Probably culture virus will eventually supplant the older and cruder calf lymph, but it has so far been received with little enthusiasm in this country. For one thing the immunity resulting from scarification with calf lymph is probably more lasting than that following the use of culture-virus vaccine. The fact that a high proportion of Army recruits have not been previously vaccinated has led to a high percentage of severe reactions among them. The ætiology of the post-vaccinal reactions involving the central nervous system is still obscure; it may or may not be due to altered properties of the vaccinia virus.

RABIES

Being conveyed by the bite of an infected animal—usually dog, jackal or wolf—rabies does not occur in epidemic form; but it is so prevalent among animals in the Near and Middle East that prophylaxis against it is important. The virus of "street-rabies" is present in the saliva of the rabid animal and is implanted into the tissues of the victim when the creature bites. It is picked up by the nerve endings in the vicinity of the bite and travels along the nerves to the brain, where it becomes fixed in the cerebral cells. The disease then becomes manifest and ends fatally. The object of antirabic treatment is, therefore, to neutralise the virus before it reaches the brain. The incubation period varies with the distance the virus has to travel along the nerves to reach the brain. Once a man has been bitten by a rabid animal there is always a race to stimulate the body to produce sufficient anitviral bodies before the brain is attacked. That is to say, active immunisation is begun after the patient is suspected of being infected. The immunity developed is not lasting, so that it would not be practical to undertake immunisation in advance in dangerous regions.

Three main types of anti-rabic vaccines are extensively used to-day:

1. *Attenuated virus vaccine.*—Pasteur's original method is still widely used in French Pasteur Institutes and in those under French influence, but it requires personal attendance of the patient at the institute.

2. *Live virus vaccines.*—Hoeyge's method consists of injecting suspensions of the living unattenuated fixed virus obtained from brain tissue of experimentally infected animals in descending dilutions. The method is widely employed in Europe, but the patient must also attend at an anti-rabic institute for treatment.

3. *Killed virus vaccines.*—The most important of these and the one most widely employed in the Middle East is based on Semple's method. As now prepared in Kasauli it consists essentially of sheep's brain fixed virus, killed by phenol. This is the method recommended for use in the Army, because the phenolised suspensions of killed virus will retain their antigenic activity for several months, and can be kept in stock where wanted, ready for immediate use.

YELLOW FEVER

Reed, in 1902, regarded yellow fever as a virus disease. Many research workers succumbed to it, and in order that investigations might continue some form of prophylaxis was eagerly sought. The first form of immunisation consisted of simultaneous injection of the living virus, modified by frequent passage through mouse brain, and human convalescent serum; it was employed successfully. Killed virus vaccines have little or no immunising power but attenuated living virus vaccines can be prepared which can be given without convalescent serum and possess high antigenic value. A stabilised attenuated strain of the virus is cultured on chick embryo, dried and sealed in ampoules. The vaccine is prepared for injection by the addition of sterile distilled water to the dried powder. Reactions are as a rule trivial. Immune bodies appear in the blood within a week of inoculation and reach their maximum titre in 6–8 weeks; immunity probably lasts 3–4 years. Inoculation with this chick embryo culture virus vaccine is a routine procedure for all Europeans entering the yellow-fever belt, and large numbers of inoculations have been carried out during the last few years.

INFLUENZA

The pandemic of influenza in 1918 was responsible for more deaths than the war of 1914–18. In 1933 Laidlaw and his fellow workers proved that the causative agent was a virus, and attempts were made to produce a protective vaccine. It was found possible to immunise animals but clinical trials of the vaccines did not meet with the success that was hoped.

A vaccine recently introduced in America promises better results; it consists of a mixture of cultures of the virus of dog distemper and of a particular strain of influenza said to contain multivalent antigens. Extended trials of this vaccine are being undertaken in this country, but it is too early to make any pronouncement on it. The lack of natural immunity resulting from an attack of the disease makes it unlikely that a vaccine made from a single strain of virus will give satisfactory protection, but possibly some form of compound vaccine will turn out to be the solution.

RICKETTSIAL DISEASES

Next to influenza, in the last war, European typhus and trench fever were responsible for more sickness than any other diseases. Both are louse-borne. Conditions might recur which favoured these diseases; they can be readily prevented in normal times by getting rid of lice, but it is not always possible to do this during military activity. During the last war and for some time afterwards passive immunisation by the injection of convalescent serum was used against typhus fever on a limited scale. Later the rickettsia was cultured in the intestines of laboratory-bred lice. By intra-rectal inoculation it was possible to prepare small quantities of suspensions of the rickettsia for vaccines; they were treated with 0·2% formalin given in three injections. The work of preparation was so exacting that the vaccine could only be used on a relatively small scale. Chick-embryo cultures have given promising results, but Zinsser's method of buttering minced guineapig-tunica cultures of rickettsia on agar-tyrode-serum media and incubating for about 16 days has yielded richer growths. Immunity trials with suspensions have been satisfactory.

Durand and his fellow workers have infected the respiratory passages of white mice with cultures of typhus rickettsia and subsequently made vaccines from the lung tissue. Trials among the native population of North Africa showed that these produced an adequate immunity. This mouse-lung vaccine may owe its immunising properties to the fact that although formolised it is not completely killed; most workers agree that killed vaccines have little immunising power. The reactions are said to be trivial, but the virus may remain alive in the bloodstream for a considerable time. Under war conditions the troops may become infested with lice, and when lice begin to feed on hosts whose blood contains living rickettsias there is a danger of a serious epidemic. At present protective inoculations against typhus should be restricted to those who are less likely to become infested with lice—medical officers, nurses and sick orderlies who would receive and attend to typhus patients.

Trench fever seemed to disappear with the cessation of hostilities; but the reservoir of infection has probably been kept alive in Europe, because similar fevers have been noted from time to time in Poland and Russia. The rickettsias of the trench-fever group are distinct antigenically from the typhus group, but are subject to the same conditions of growth, and the possibility of preparing a vaccine by Durand's mouse-lung method is already under consideration.

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In England Now

A Running Commentary by Peripatetic Correspondents

WHEN my sister-in-law and I had finished telling him about the state of Europe my brother said: "The trouble with you professional women is you're so damned depressing." "Nonsense," we replied as one professional woman, "we face the facts." Since then I seem to have met nothing but people who face the facts with equal fortitude and state them just as ruthlessly. The facts, however, though inescapable, overwhelming and unpleasant, are never twice alike. Take Ellinor now; she says that everybody knows we have no army in the East and that we can't spare ships from the Mediterranean to guard the home waters. Rick says there's no doubt that the country is riddled with fifth column and the trouble is they're so damned efficient; Enid assures me that this war means the end of civilisation as we know it, and seems to regard that as a loss; Rob says we are going to hang ourselves in red tape; Sal writes "not a planner among us," and Harry mutters darkly "look out for Spain." Then I came across Francis, and he said it wasn't the war that was the trouble; just wait for the peace. Then we should starve if you like. I didn't like, but I wasn't such a fool as to say so. No-one shall say I can't face a fact when I see it. While we were allowing our grim theories to edge out beneath stiff upper lips Emily came in, trailing a ball of wool from her knitting. "Have you heard the news?" she said, settling herself agreeably in the most uncomfortable chair in the room. "No," we said expectantly. "The war's going to be over next year," the poor simpleton responded. "I've just been told by Mrs. Poodle. She's so psychic." We showed our teeth in humane grins and drifted disdainfully away. Emily of course went on with her knitting, but she had set my mind working at last. These facts? I don't know when I last heard a fact, a naked decent fact. I don't know that I should recognise one if I heard it. It looks as though we keep on facing speculations and if we are built like Emily we pick pleasant ones and if like me we pick them sombre. It's all according to taste, or endocrines or something. However, I have made a New Year resolve and am thinking of having it printed to send out to my friends. "No facts faced unless authenticated." My sister-in-law will be disappointed in me. "Can't take it, huh?" she will be thinking. But she mistakes me. I can face the facts all right, one at a time; but I'm dashed if I'm going to face everybody else's favourite phobias, too.

* * *

Some of God's creatures are funny; toucans, for instance, and dictators (if these latter are indeed God's creatures). Others definitely command respect and of such is that admirable bird the wood-pigeon. Swift, hardy, efficient and self-reliant one cannot imagine the wood-pigeon ever feeling sorry for himself. No bird or beast has keener vision, and as he flies he turns his head now this way now that, keeping a sharp look out for chaps with guns. He eats like a horse and can digest like an ostrich, thus making himself unpopular with the farmer; so that even the most humanitarian need have no qualms about trying to shoot him. From the gun's point of view he is an excellent bird, providing an endless variety of difficult shots. Cartridge-makers also must love him, for attempts at his destruction entail the expenditure of vast quantities of ammunition; he who regularly kills one pigeon to five cartridges is not doing badly. Nor is he to be despised on the table where he makes a useful addition to the meat ration—if you can get him there.

* * *

When I was a student in London I often used to go and see an old man whose principal attraction was that he had been at the seige of Paris, and it was with this instinct for listening to the footfalls of history that I went a fortnight ago to do a locum within a mile or so of the City. I come back to the country with a profound admiration for the adaptability of the Cockney. True, during the day-time the great arterial highway with its blaze from shop windows, its blare of stalls, its motley, good-humoured, self-reliant multitude are much the same as ever; fewer children, here and there a heap of rubble where houses stood—but on the whole the fascinating stream rolls on the same. In the evening, however, when the sirens have gone—no-one heeds the day ones—it changes. Dark, mysterious buses like giant glow-worms, faint flickering push-bikes in the roadway, a clapping of purposeful, untarrying footsteps on the pavement, shuttered shops with only an occasional faintly gleaming "Open" on the door, all give an air of expectancy and peril. The back streets at night are empty and silent, the moving tin-hat of the warden, the faintly illuminated "S" of the shelter, otherwise it might be a city of the dead. I had great difficulty in finding houses at night and once went back to a house three times before I was answered. They were sheltering in a back room. It was an old lady with an old stroke; they thought she was worse. "It she disturbed by the raids?" I asked. "Not a bit," they said. "I like to hear the guns," she croaked from the bed. I saw a lot of that, the bed-ridden invalid or senile stimulated into a soldier of the line. I looked into shelters, Hogarthian scenes—propped, lying, huddled figures of men, women, and children on asphalt floors without mattresses, grey cement walls and rough fresh carpentry. I noticed many patches of vomit in the street. A policeman explained: "It gets so foul down there that when they come up they cough and cough, old people, babies, and all." I was called to see a girl with a hysterical fit in a shelter. One warden was stroking her head, another her calves, and others as opportunity arose; it had nothing to do with air-raids, a backwash from a love affair. I have a hundred cameos of this bombed London; a pack of children enjoying a lawless holiday with unrivalled opportunities for sight-seeing and adventure; an old Jew at the rest centre, who had been bombed out thrice, but refused to be evacuated till his affairs were settled, no advance without security; stalwarts who preferred comfort or privacy to safety and slept in their bedrooms; a gallant army of unregarded men and women who are displaying a toughness which I envy. I saw much of medical interest—three cases of urticaria following close bombing, more scabies than I've seen for years, shelter œdema of the legs, the waspish short temper of the bachelored man. I heard few complaints, but "What's the use of complaining?" many times. It is absurd to believe in democracy and then resent it being intelligent, and I heard much criticism of those of our leaders who took part in the farce of non-intervention, the humiliation of appeasement, the folly of ceding the Irish naval ports, which is costing us so many lives every week. This was less recriminatory than fearful that the same faulty, flabby judgments should still operate to the nation's hurt.

* * *

I don't see why one shouldn't extract what pleasure one can from this war. Living in a defence area the country is delightfully quiet, especially at week-ends which used to be so noisy with traffic, belching and snorting till late on Sunday night. Now it is quieter than it was even before the last war. That melancholy jangle of church bells, which always stirred my soul in conflict (ought I to go?)—I revel in their silence too. Then one can't ask people to stay; it's not safe, and, anyway, probably wouldn't be allowed. Again, when one's on duty, standing by, one can sleep in one's clothes, or some of them. I like sleeping in my clothes. I often used to in peace-time, but then I had to remember to ruffle my pyjamas in the morning. I wonder with what diseases we pay for pampering our skins, putting on soft, smooth raiment, changing it at night, washing the natural fats off with mild caustic. We pay for most modern "improvements": rickets for coal and clothes, the deficiency diseases for our unnatural foods, respiratory diseases for house, church, and factory air, and so on; it's a long list. I was pleased to see in a recent article that in being fussy about our bread and excluding dear old penicillium we may be losing a valuable ally. When will man learn that he is as much a part of nature as an earthworm? Last week I bought a sixpenny packet of water-cress seed and have got enormous pleasure from planting pinches of it in the mud by stream and pond and ditch, wherever I go, my mind

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picturing large succulent patches of it in the summer. If I had been asked why I planted it I should have rationalised the process and explained that it was a war-time effort to increase food supply in a simple way. But that wouldn't be the whole truth. When I was a boy I was doing the same sort of thing, carrying pails with tench in them for miles to stock barren ponds. I generally get the same sort of urge every autumn; for the last few years it has been an irresistible desire to plant fruit trees. Probably men on the one hand and hens, cabbages, sheep, and water-cress on the other live in the same sort of loose symbiosis as the algæ and fungi in some lichens, and I have been instinctively fulfilling my side of the bargain.

* * *

The Quartermaster and the M.O. have fallen out, and it is supposed to be less dangerous to walk through the line of fire of a Lewis gun than quarrel with the Q.M. But the Doc is holding his own. It started after our seventh (since August) move. The Q.M. went with the advance party, and took for his stores the room which the previous battalion had allotted to the M.O. for his medical inspection and casualties. He gave our M.O. a rather ordinary room, up the narrowest flight of stairs I have ever seen. The M.O. asked for what he considered his own room back. The Q.M. refused; but the Doc scored a minor triumph by getting an advance booking for the best rooms at our eighth (and present) place of location. Then the Q.M. scored a small verbal win. After lunch, when every officer was in the ante-room, he announced (quite untruthfully) that he had been along and chosen the Doc's room—"with roses and carnations over the door." The night we got to our new home, these premises were destroyed by a bomb. So now the M.O. is on the warpath again. His present temporary place is well out of the town; and when the Q.M. said it would do the Doc good to walk there, the Doc replied in injured tones that he did not mind how far he walked but he was not going to see sick men walking x miles to visit him. This retort was so good that we very nearly lost the magnificent officer's mess. Now we are all on tenterhooks wondering for which building the M.O. will make an impassioned plea next—battalion headquarters, signals house, the motor transport, or the Quartermaster's stores.

* * *

There are, I imagine, many foreigners, especially Teutons, who fail to appreciate the humorous third leader of the *Times*, and who might wonder what your peripatetic correspondents are doing in a medical galley. They would be out of place In England Now, or, let us hope, hereafter. In the German medical weeklies which I read leading articles and annotations by the editorial staff are absent. Articles of the kind are, I think, useful to us all, especially to the overworked and the lazy. They often give a synopsis of work done or in progress, and are reminders that a subject is still fluid to those who fancy they know its ultimate physio-pathology—say the lipoidoses, or the functions of the posterior pituitary. One's legal friends are annoyed when some judge, setting up a new ruling, punctures the snug cocoon in which they are ensconced; let them survey the tables covered with current literature in a well-stocked medical library. The leaders in our journals also serve as an exercise in clear and succinct expression, an art in which our profession is not strong. The German weeklies give from time to time a comprehensive survey of some subject by an authority, followed by a heart-breaking bibliography; all done with that unswerving thoroughness, diligence and dullness for which their people are renowned. It would take a Voltaire's mordant wit and many cups of coffee to deal faithfully with such a *Sammelreferat*. Another German practice is to publish monthly or bi-monthly reference-numbers as supplements to journals dealing with special lines of work. I can speak with knowledge of only one, that attached to the journal dealing with neurology and psychiatry. To produce regularly a work of this kind requires editorship, many skilled collaborators with knowledge of languages, industry, money. That the English-speaking world is content to leave this and like fields to Germany is, to my mind, discreditable.

Letters to the Editor

ANÆSTHESIA IN THE SHOCKED PATIENT

SIR,—The letter by Mr. Ruscoe Clarke and Mr. Kessell (*Lancet*, Nov. 23, p. 664) and your leading article of Dec. 21 invite comment. It is possible that your correspondents have made the error common on the continent of comparing results following local anæsthesia given by a skilled surgeon with those following general anæsthesia supervised by a hospital orderly or nurse. While it is true that "methods of local anæsthesia should be further explored" there is little to suggest that a general anæsthetic, skilfully administered, adds to shock. It cannot be stressed too strongly, however, that a clear airway must be maintained throughout the whole period of unconsciousness, that the patient must be kept adequately oxygenated, and that only enough anæsthetic should be given to allow the operation to be performed satisfactorily. The shocked, exsanguinated, or heavily morphinised patient is already well on the way towards unconsciousness, and the required depth of anæsthesia is achieved in a patient depressed by any means with a much smaller dose of anæsthetic drug than would be needed for the same patient in normal health. This point has been emphasised by anæsthetists with experience in France. S. Rowbotham tells me that he found that the shocked patient needs much less local or general anæsthetic than does the fit, and Rex Binning (*Brit. med. J.* Dec. 7, 1940, p. 794), reminding us that in the shocked a very small amount of anæsthetic suffices, writes "they (the patients) were very tired as well as suffering from the effects of their injuries and it was noticeable that a much higher proportion of oxygen, sometimes as high as 30%, was required in anæsthetising them with nitrous oxide." If ether, Vinesthene, Pentothal, &c., had been used the results would probably have been almost equally satisfactory provided the necessary amount had been given. As your leader points out the safeguard of nitrous oxide is that an overdose cannot be given provided the patient is kept well oxygenated.

Your leader, too, stresses the practical difficulties in the use of local anæsthesia. Even those of us who work under satisfactory conditions realise the extra work, attention and time needed if they are employed widely. In some cases the technique is easy and the results striking—e.g., brachial-plexus anæsthesia for operations on the upper limb, or in abdominal surgery. Blocking of the abdominal wall, however, may well be difficult to carry out in cases of penetrating wounds of the abdomen, and in any case injection of the splanchnic plexus is nearly always necessary, and is inevitably followed by a fall in blood-pressure. For major surgery in other parts of the body the technique is not so easy, nor are the advantages so manifest.

Binning points out the help of the practice followed in this and other hospitals of having a label attached to the patient showing what premedication he has had and when it was administered. On the reverse side of the label the anæsthetist writes the anæsthetic which has been given, and any postoperative instructions. These details all play their part in the prevention of post-operative complications to which the shocked patient is so susceptible.

Radcliffe Infirmary, Oxford. R. R. MACINTOSH.

SERVICE PATIENTS IN SANATORIA

SIR,—A peripatetic correspondent in your issue of Dec. 14 writes of the difficulty in getting hospitals to involve themselves in Army board procedure. As a medical officer in one of the seven sanatoria which take cases of tuberculosis from the Service hospitals for "boarding" I see many of the points that create this difficulty. The turnover of patients is large, the average length of stay being two or three weeks, and a large number of forms have to be dealt with. In view of the short period of residence little can be attempted or accomplished in the way of treatment, and one gets the feeling that a lot of time is being spent where it is possible to do very little, probably at the expense of civil patients on whom it might be more beneficially employed. The majority of service patients do not feel ill while they are in the sanatorium, and with no military

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authority it is difficult to enforce discipline. If cases get really bad an example is made, and either the patient is transferred under guard to a military hospital (only to come back for the actual boarding) or a military court sits here with great ceremony and at least a temporary effect. Lesser breaches of discipline have to be ignored, and it is these that make it much harder to keep civil patients in order; if the soldiers can play up why shouldn't they?

Although it is admittedly wise for a patient suspected of tuberculosis to have the advantage of sanatorium facilities before being definitely labelled, it might be better for the military to take over sufficient complete sanatoria or parts of sanatoria, and to run them with both clerical staff to deal with the forms, and officers to maintain discipline. We are told that such staff can only be allowed when the number of patients reaches 150.

Middleton-in-Wharfedale. ROBERT FLEW.

THE SICK IN BOMBED AREAS

SIR,—The letter signed "Cockney" in your issue of Nov. 30 was, in its comments on the casualty services, so obviously the product of an active and untrammelled mind that it calls for detailed consideration.

Unfortunately the reaction of medicine to total war has not been so thorough as the situation demands. The assumption has been that the system in force in August, 1939, was an efficient if not an ideal one, and that the only adaptation called for was a scaling up of the existing services to meet the larger needs of war. No-one seems to have realised that the problems of war-time medicine differ in nature as well as in size from those of peace. Doctors tend to take it for granted that casualty services dealing with surgical cases are still engaged on civilian as distinct from military medicine. Even where they accept that the surgical problems are new they still do not make any great changes in their fundamental technique. As for the rest of medical practice, including preventive medicine, that, they feel, can carry on much as before. The truth is that if we are to wage a total war successfully we must accept its totality. As far as the dangerous areas are concerned all medicine is now military medicine. Appreciation of this fact is the first stage in proper organisation, and failure to grasp it accounts for much of the confusion in our local services. The principles of military medicine are:—

Flexibility.—Aid, in the first instance, must be conveyed to the patient rather than the patient to the aid.

Accuracy.—Immediate deterioration of the patient's condition having been checked and his exact needs having been determined he must be evacuated from the danger zone along a pre-selected route to a point organised for specialised and definitive treatment.

Continuity.—The entire treatment of the patient from casualty point to convalescence must be a continuous process; like the manufacture of a Ford car, the problem must be tackled on conveyor-belt lines.

Totality.—Mass prophylaxis is imperative. This, on the surgical side, will include intelligent use of body-armour and tactical cover; and on the medical side will extend over the whole field of hygiene and immunology, including in its scope the entire civil population of any military area.

Applying these principles, our needs now are:—

1. For casualties, a system of rapid rescue, early, accurate classification, and evacuation along chosen routes to hospitals outside the casualty-producing area, in which only urgent surgery would be performed.

2. For medical cases, a permanent diagnostic service (the skeleton of which exists and has been greatly improved of late by the Ministry of Health), backed by adequate and highly organised facilities for hospitalisation.

3. For prevention, mass prophylaxis, and drastic preventive hygiene covering every known vector. Given a slight extension of statutory power in the direction of compulsion, we have already in the Ministry of Health and in the local government services all the machinery needed for this work.

4. For the medical profession as a whole, the recognition that medicine must be re-planned to serve new units—not only the units of the Army, but the community units as represented by the shelter crowd. This implies the abandonment of the organisation of medicine on its present individual lines.

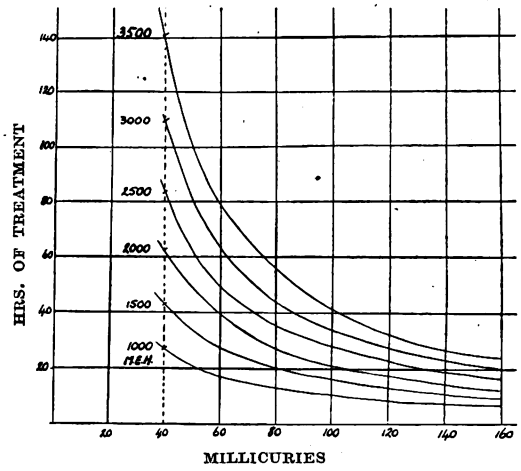
Medicine has ceased to be an affair of contract between two individuals. It is the concern of the nation as a whole; it can only be served by what in effect must become a state medical service. Already in the bombed areas the evening surgery is impracticable and its work will inevitably be covered by the medical aid-posts placed in shelters by the Ministry of Health. As a profession we must decide whether we are willing to plan boldly to meet obvious necessities, thus building up a service which will continue in utility when the war is long past; or whether we are going to shuffle from stage to stage under the pressure of events, meeting each catastrophe with half-hearted improvisations.

K. W. C. SINCLAIR-LOUTIT,
London. G. B. SHIRLAW.

RADON DOSAGE

SIR,—The extended use of radon calls for easy reference between equivalent physical doses when radium and radon are used; the graph reproduced here allows of this over a range largely used in treatment; each smooth curve represents a product of radium-milligramme-hours (M.E.H.), the corresponding hours of treatment with any stated number of millicuries being read off from the coördinates.

Some radiotherapists are making a virtue of necessity and seeing whether there are any essential differences



between the tissue reactions to radium and radon. Although it is of the first importance, there have been few attempts at determining between what limits the equation $Qt = qT$ holds in the field of treatment. Provided radon supplies can be augmented in the near future, we should be in a position to provide sources having quite a large value of Q (millicuries), and if a series of patients could be treated during the period of decay it might be practicable to use the radon when the quantity q was no more than 1/10 Q. Besides being of medical interest, such a prolonged use of a single radon source would be economical.

The Middlesex Hospital. SIDNEY RUSS.

THE TREATMENT OF BURNS

SIR,—It might appear from the remarks of speakers at the meeting of the Royal Society of Medicine on Nov. 6 that the problem of the severely burnt hand is a product of this war. It has certainly been neglected but as certainly is not new. Many of these derelict members, deformed and practically useless, are scattered about the country. Many thousands of pounds have been paid out by insurance companies by way of compensation for them and so great has been the disability that the question of amputation has at times been raised. These unfortunate results are not confined to the smaller towns and hospitals where treatment may fall short of the specialist standard. They have occurred in spite of expert supervision at noted surgical centres.

In the last case sent to me the ends of the middle, ring and little fingers were shrunken, dry and necrotic. Although the damage was five months old the dead tissue had not completely separated, a characteristic

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of the dry gangrene which occurs in these cases. It may be that failure to skin-graft granulating areas is responsible for the observed contractures. Even so, this omission may be deliberate because attempts to graft irregular areas have so often failed. This fatalistic attitude will be understood when it is considered how small a proportion of secondary skin grafts in favourable positions and in the hands of experts achieve complete success. I am certain that the observed necrosis and crippling deformity has nothing to do with tannic acid or any other coagulant method used in treatment. Inadequacy of the terminal circulation and contractures have been due to the extent and depth of skin destruction occasioned by the initial injury. In operating on these cases after healing and contraction has occurred it has been found that joint capsules have been involved and that tendons, their sheaths destroyed and interrupted in their course, have developed adventitious attachment to prominent articular margins.

It is easier to control contractures resulting from destruction of skin on the extensor than on the palmar aspect of the hand and fingers.

The essential feature leading to contractures on hand or face is the extent of skin which has been totally destroyed. Before this or that treatment, properly used, can be blamed for these effects it will be necessary to show that when the treatment is discarded similar results do not follow similar lesions. Undiscriminating advice never to use tannic acid on the face and hands (the laggard feet have since been included) must be subjected to searching criticism, the more so because it is bracketed with advocacy of lanolin as a prophylactic against keloid. The merging into one category of second- and third-degree burns, as suggested by Mr. McIndoe, will inevitably lead to confusion by encouraging the comparison of lesions that are not comparable. I suggest that crippling and distortion will continue to result from destructive burns of the hands and face in spite of all attempts to prevent them. The reparative surgery of these end-results has achieved considerable success in some directions. Elsewhere, particularly in the hand, an attitude of complaisant acceptance, or even deliberate obstruction, has too often prevented the employment of measures to improve function and mitigate deformity.

Wimpole Street, W.1. PERCIVAL P. COLE.

THE SEDIMENTIN INDEX

SIR,—In Dr. Day's paper on the sedimentin index (*Lancet*, 1940, 1, 1160) he states that correction for cell volume is a mistake in that the differences recorded in the sedimentation-rate by diluting the blood with plasma have no real significance. If a patient loses red cells and his red-cell count is thereby lowered each ml. of his blood will now contain correspondingly more plasma and the cell volume will be lowered by dilution with the patient's own plasma. It appears then that if the sedimentation-rate is to serve as a guide to "tissue destruction" and not as a measure of "anæmia" a cell-volume correction is necessary. So far as the clinical values of the sedimentation-rate and sedimentin index are concerned I do not doubt that the latter is by far the surer pointer to tissue destruction.

Royal Hospital, Wolverhampton. A. W. FARMER.

PSORIASIS AND RHEUMATOID ARTHRITIS

SIR,—I read with great interest the letter in your issue of Nov. 30 in which Dr. Barber mentioned the frequent association of psoriasis and rheumatoid arthritis. I made this observation myself a number of years ago, finding psoriasis also to be prevalent in cases of so-called infective arthritis, but I could find no reference to the association in the literature either of rheumatism or skin conditions. We were then making a study of the bacteriology of these cases, but did not find any definite evidence of hæmolytic streptococci. I am bound to admit, however, that all cases were not thus investigated, and that cases associated with psoriasis were not specially selected for investigation. The suggestion that both conditions may be the result of sensitisation to a bacterial poison is an attractive one, and there is a good deal to be said for it.

J. W. SHACKLE.

dCross Clinic for Rheumatism, N.W.1.

DIPHTHERIA DIAGNOSIS BY POST

SIR,—The unhappy picture portrayed in your annotation of Sept. 21 is as you say a "not very rare" event, and yet in the light of the heights reached by present-day medicine it sounds almost unbelievable. Many instances of a similar potential catastrophe can be found throughout the country. The three players in the tragedy are the parent, the practitioner and the local authority. The difficulty with the first may be overcome with immunisation and by "medical" education; in the latter the Londoner is much more proficient than his country cousin. The practitioner must be primarily a clinician and not a waiter on bacteriological services. In my view the chief blame attaches to the local authority whose implicit duty it is to provide rapid diagnostic facilities. A service which is not ready to give a result overnight is not only of little use, it is a trap. You state that some authorities are unable to provide the best facilities because they would be "uneconomical." Surely the real reason is either lack of appreciation of the results at stake or unwillingness to reorganise a system, long out of date. No money matters should stand in the way of saving child-life.

The solution of the problem lies in the relegation to the past of the idea of "postal bacteriology"; delay in the post may mean a delayed result, but more important is the possible drying of the swab making the whole procedure useless and often giving a false result. For practical purposes the only way to achieve a service helpful to the practitioner is the use of the personal messenger and of the maintenance at the laboratory of someone who can inoculate media up to (say) 11 P.M. Such a system has been in use in these laboratories for several years without mishap. It may sound ambitious for rural areas, but it is worth the trouble it takes and supplies the difference between a diagnostic aid and a trap for the practitioner and death to the patient.

The problem of diphtheria is at present being brought into the public eye by the Minister of Health's drive for the immunisation of young children. Now, therefore, is a suitable time to rationalise the country's bacteriological diagnostic facilities.

MAGNUS HAINES.

John Burford Carlill Laboratories, S.W.1.

THE DE-SPECIALISING OF PATHOLOGY

SIR,—Dr. Goodhart's views (*Lancet*, Dec. 14, p. 737) must be shared by all clinical pathologists and I would like to amplify the suggestion in his final paragraph that laboratory workers should have greater clinical responsibilities. Deficiency diseases requiring accurate dosage as in the treatment of the anæmias or diabetes mellitus could be treated by the laboratory worker with considerable saving of the patient's time and also cost of materials. For instance, I have known of cases where liver extract has been pumped into the patient by succeeding generations of house-men when the patient was not suffering from addisonian anæmia at all. This represents much waste of material. Again, the maintenance of an adequate concentration of the new sulphonamide drugs can best be supervised by the laboratory, and the accurate reconstitution of the blood volume by means of serum in the treatment of burns or shock can be undertaken only by the laboratory worker.

Recognition of these facts and allowing the "poor pathologist" to use his talents under his own authority will most quickly bring about the results which Dr. Goodhart desires. But, Sir, national policy seems to be leading in the opposite direction. The establishment by the E.M.S. of big base laboratories accepting specimens from a distance at 3*s.* a time will soon make pathologists superfluous, particularly those engaged in private practice. In fact, there seems to be no reason why, in the interests of national economy, this work should not be carried out by technicians alone.

Queen Mary's Hospital, E.15. W. W. WALTHER.

A WAR-TIME SPECTRE

SIR,—Many readers are a little weary of the State Medicine controversy, which drags drearily along although the spectre, seen first in the middle distance, seems now to have disappeared below the horizon. Some remember a similar agitation during the last war, the embers of which were extinguished by the stirrup-pump of realism

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while the budding bureaucrats were still deciding where they would like their desks. It is noteworthy that small interest is shown in these projects by the leaders in medical and surgical practice, the s lect company who in normal conditions have always more work than they can comfortably attend to, yet contrive to find time for a great deal of unpaid public service.

Rates and taxes will be heavier, alas, and building construction a major industry, but in other respects the post-war world will in all probability be very like the pre-war world, in which for many years the British Commonwealth set the pace in the defence of liberties, the redress of wrongs and the promotion of social justice. Many consultants will again be busy, and even more consultants will still be waiting for the patients who never came. In fine, we shall be living in an unregimented economy which presents opportunities in plenty for the industrious and worthy, but is neither the gossamer heaven of Mr. J. B. Priestley nor the blissful Elysium of the street-corner orator, where fags are free, the work is sent out, and Sunday comes in the middle of the week.

But we have not heard the last of State Medicine. It will be groomed and trotted out again during the next war.

Great Russell Street, W.C.1. H. D. L. SPENCE.

ABDOMINAL ACTINOMYCOSIS

SIR,—The paper by Mr. Dorling and Mr. Eckhoff in your issue of Dec. 7 provides valuable confirmation of earlier reports that actinomycotic infections are amenable to chemotherapy; but even more interesting is the conclusion that may be drawn that abdominal actinomycosis is commoner than usually supposed, since the five cases in this series were observed in one hospital during a period of 13 months. Of case 2 which was under my care during his stay in Lewisham Hospital Mr. Dorling states that it was typical of severe abdominal actinomycosis. But the characteristic indurated mass infiltrating the abdominal wall and discharging through multiple sinuses was absent, and in my opinion the case was clinically indistinguishable from gangrenous appendicitis complicated by a residual abscess. It is true that a streptothrix identified as *Actinomyces bovis* was isolated from the discharge, but the possibility that this streptothrix was a non-pathogenic commensal derived from the intestinal tract (the patient had a fæcal fistula for a time) should be considered before accepting the case as one of abdominal actinomycosis.

Winchester. G. C. D. ROBERTS.

Public Health

Tuberculosis in Wales

THE twenty-eighth annual report of the King Edward VII Welsh National Memorial Association shows that the expenditure in 1938–39 was £331,000 and that the Minister of Health considers an estimated expenditure of £405,000 for 1940–41 to be reasonable. As Wales was—and still is—almost entirely a receiving area, the association wished to know the position in regard to the cost of treatment of tuberculous evacuees. The minister holds that, since it is the duty of the association to cater for all persons found to need treatment while resident in Wales and Monmouthshire, it must carry the burden itself; he points out that until the war there was a steady migration from Wales to England and that an alteration of the law might relieve Wales during the war but would eventually act to her disadvantage. The relation of silicosis to the tuberculosis service is also raised in the report. Silicosis, not being a tuberculous disease, is obviously outside the service; but because there is no organised means of treating silicosis, and because it is often associated with tuberculosis and requires the kind of treatment which the tuberculosis service is in a good position to dispense, there is a growing feeling that the law should be amended to enable silicosis to be included in the tuberculosis scheme. The objection raised is that it might be the thin edge of a wedge admitting all pulmonary crippling to the benefits of the tuberculosis service; but this might well be an advantage too.

On the outbreak of war the Welsh institutions for the tuberculous, like the English, were emptied and prepared to receive war casualties. This policy was speedily changed, but for a time the country was in considerable peril from the non-return of patients who were dangerous to the population. In Wales this danger is over and the "waiting-list has long since returned to its former tragic proportions."

An interesting table compares some of the work done by the association with similar work done in England. For every 100 deaths from tuberculosis there are 804 names on the live register in Wales compared with 718 in England[1]; there were 1568 radiographic examinations compared with 691, and 757 cases examined against 419. The number of new cases examined per 100 deaths was almost identical in both countries (155 and 156). The figures throw some light on a doubtful point: what is the true fatality of pulmonary tuberculosis?

An increase is evident in the percentage of T.B. plus 3 cases found among admissions to institutions. In 1937 it was 40·79; in 1939 it was 46·31. This means an outstanding failure of the whole tuberculosis scheme and calls for exploration of its causes unbiased by political or economic considerations. Of 1103 such cases discharged from institutions only 7 were quiescent, 823 were active and 273 dead. Of 1221 new T.B. plus cases examined last year, 2 were under five years of age; 13 between five and fifteen; 376 between fifteen and twenty-five, and 332 between twenty-five and thirty-five. In grades, 79 were T.B. plus 1, 477 were T.B. plus 2, and 605 were T.B. plus 3. In the age-period fifteen to twenty-five there were 158 males and 208 females. In both sexes more than half the cases were in the T.B. plus 3 stage.

After this report had appeared the Communist Party of Great Britain issued a pamphlet—a sequel to one published two years ago—setting out a thirteen-point programme for the war against tuberculosis in Wales. On most points the only difference between the W.N.M.A. and the Communist Party is that the former holds that this ought to be done and will be done when we can afford it; whereas the latter says that this must be done and the means to do it must be found at once. Other points, such as the payment of expenses, including loss of work, to enable patients and contacts to attend clinics; special increases of U.A.B. and P.A.C. to tuberculous families; special housing facilities, and home helps to enable women to accept institutional treatment, are acceptable in principle to all political parties; only the means of achieving them, of paying for them, and the rate at which they can be introduced are controversial.

Infectious Disease in England and Wales

DURING THE WEEK ENDED NOV. 23, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1750; whooping-cough, 2324; diphtheria, 1366; enteric fever, 26; measles (excluding rubella), 13,561; pneumonia (primary or influenzal), 713; puerperal pyrexia, 131; cerebrospinal fever, 139; poliomyelitis, 33; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 91; ophthalmia neonatorum, 67. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 29 was 1762, including: scarlet fever, 296; diphtheria, 260; measles, 594; whooping-cough, 69; enteritis, 41; chicken-pox, 183; erysipelas, 49; mumps, 25; poliomyelitis, 1; dysentery, 4; cerebrospinal fever, 28; puerperal sepsis, 9; enteric fevers, 9; german measles, 2; other diseases (non-infectious), 70; not yet diagnosed, 122.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 2 (0) from enteric fever, 5 (0) from scarlet fever, 13 (0) from whooping-cough, 25 (3) from measles, 42 (3) from diphtheria, 35 (3) from diarrhœa and enteritis under 2 years, and 25 (2) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 2 deaths from enteric fever. There were 12 fatal cases of measles at Liverpool. Deaths from diphtheria were scattered over 22 great towns, Liverpool reporting 6, Plymouth and Swansea each 4.

The number of stillbirths notified during the week was 176 (corresponding to a rate of 37 per thousand total births), including 9 in London.

1. The Welsh figures are for 1937, those for England are for 1938.

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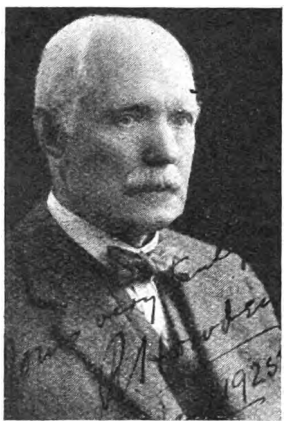
Obituary

ROBERT HOWDEN

D.SC. DURH., M.B., C.M., LL.D. EDIN.

THE death of Emeritus Professor Robert Howden at Crieff, Perthshire, on Dec. 7 removes one of the great anatomists of the last generation. Born at Braco in the same shire in 1856 he studied at Edinburgh University, qualifying with high honours in 1884 and then demonstrating in the dissecting room. After some study at Leipzig he became one of Sir William Turner's young men until, like so many others trained by that grand old man, he crossed the border to teach anatomy in an English university. In 1889 he was appointed lecturer at the University of Durham college of medicine, and four years later became the first professor of anatomy at Newcastle. His appointment coincided with the opening of the new college buildings which were some of the best of the period, only vacated in 1938. There he built up the tradition of sound anatomical teaching brought with him from Edinburgh, and contributed largely to the growth and success of the Newcastle school, then at a crucial stage of its development. Of his teaching an old (indeed his first) demonstrator writes: Howden came to the college in my final year and lectured to us on surgical applied anatomy. At these lectures there was always the beautifully dissected region, and this was shown to us with vigour and energy, helped by quick drawing on the board and every variety of diagram and model. In the dissecting room, when he went his round of the tables, he showed extreme dexterity and quickness in making all the structures appear clearly, finding with a few touches of the knife such slender nerves as the branches to the palmaris brevis and the pectineus. He seemed to impart to the students some of his quickness and vigour, bringing order out of chaos both in the student's mind and in the room itself. And he was always concerned about the welfare of his students. Some wayward ones, after a visit to his room, mended their ways; I wondered what he said to them. To me he seemed like one of Carlyle's heroes—a man full of boundless energy, tireless and unceasing work.



During those early years in Newcastle Howden was the only full-time member of the staff, and it was inevitable that the administrative duties so frequently placed on the shoulders of the anatomist should descend upon him, so that in due course he became secretary, dean of the faculty of medicine and registrar. In these multiple capacities, wrote Grey Turner in his history of the school, Howden gradually assumed a position something like that of a dictator, adding "as far as the students were concerned he was a wise and considerate dictator." Both as professor of anatomy and as college official he was for many years a father to the college of medicine, and through the generations of students who came under the searching but kindly eye of "Bobby" he exercised a profound influence on the medical profession in the North of England.

Despite his teaching and manifold administrative activities Howden still found time to edit Gray's Anatomy, being responsible for seven successive reissues of that tome, and through this medium his influence spread over a far wider field. His wide knowledge and attention to detail did much to maintain and enhance the prestige of this textbook. He was also responsible for the section of Cunningham's Textbook of Anatomy dealing with the special senses. From 1914 to 1916 he was president of the Anatomical Society of Great Britain and Ireland. For the ten years 1918 28 he represented the University of Durham on the General Medical Council, and he examined in anatomy for many universities.

Howden was a lovable and generous man, always helpful to his juniors and never too busy to give a word of advice or encouragement. He enjoyed golf, fishing and curling, and was happiest when a timely frost enabled him to put the stone for an hour or two. He was a lively raconteur, particularly when the presence of Edinburgh contemporaries loosed his tongue, and his successor in the Newcastle chair recalls with gratitude many pleasant evenings spent with him and Arthur Thomson when one would vie with the other in reminiscences of an even earlier generation. Both the university of his adoption, of which he was pro-vice-chancellor in 1926, and his own university conferred honorary degrees upon him.

Professor Howden married in 1899 Gertrude Mary, daughter of J. O. Scott, of Newcastle. He is survived by his widow, three sons and two daughters.

Sir Thomas Oliver writes: Howden had foresight and he looked ahead. He possessed the gift of knowing what he wanted, and the means of expressing his views, which, as some of these were frequently of the nature of reforms, did not always meet with immediate acceptance; but we all felt that in what he said or did the things he had at heart were the interests of the college and the welfare of the students. He was an excellent teacher, for he knew his subject, and like most of his confrères could draw beautifully and accurately with chalk on the blackboard. When he was about to bring out a fresh edition of Gray's Anatomy, he had the artist for weeks by his side in the college, so careful was he about the minutest details. To students entering on their college life he was a kind and reliable guide; he was quick to recognise their good points and to encourage them, but he had no place for idlers.

He proved himself an excellent dean of the college; the members of the teaching staff recognised this and the students felt it. He was a good golfer and took part in many of the matches of university and hospital teachers. He was also a keen and successful fisherman, and made many friendships by the manner in which he handled the rod. To Mrs. Howden and her family the sympathy of his colleagues and his widely scattered pupils is extended.

WILLIAM WALLACE

M.D. GLASG., F.R.A.M.

Dr. Wallace would count as a notable example of Moynihan's medical truants, were it not perhaps truer to say that he indulged in medical studies while his musical genius was developing. Son of James Wallace, medical officer of health for Greenock, he was educated at Fettes College, Edinburgh, and graduated from Glasgow University in medicine in 1885, taking his doctorate with high distinction three years later, having in the interval been resident at the eye infirmary with the intention of making ophthalmology his specialty. During this period he lectured on premedical subjects at the Glasgow dental school, he joined the Glasgow Philosophical Society, and he defined his reasons for rejecting physiochemical theories of the origin of life. He then spent two years as clinical assistant at Moorfields before laying aside medicine for music. His earliest orchestral work, claimed to be the first symphonic poem by a British composer, was produced at the Crystal Palace in 1893 and it was followed by other works of which the most famous was Villon, played in 1910 by the Philharmonic Society. By undergraduates he was welcomed as the writer of Freebooter's Songs. Surprisingly he returned to medicine in the last war, becoming eye specialist at the Colchester Military Hospital and later at the 2nd London General Hospital. The water-colour drawings of eye injuries in the Army Medical War Museum are a permanent record of his versatility. After the war he devoted himself wholeheartedly to music, becoming secretary of the Philharmonic Society, and dean of the faculty of music in London University. He married Ottilie Helen, sculptor, daughter of Lord McLaren, senator of the College of Justice, Edinburgh.

Colonel A. G. THOMPSON who died at Redruth on Dec. 11 was born in Islington in 1867 and educated at Edinburgh where he graduated M.B. in 1891. The following year he received his commission as surgeon

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lieutenant in the army and was promoted surgeon captain in 1895. He served in the South African campaign of 1902 and was awarded the Queen's medal with two clasps. In 1904 he became major and during the last war he served with distinction in France, being mentioned five times in despatches and awarded the C.M.G. and the D.S.O. He retired in 1919 with the rank of colonel.

Surgeon Lieutenant B. H. BRINDLE was among those who lost their lives when H.M.S. *Forfar* was sunk by enemy action. He joined the R.N.V.R. only a few weeks ago, after returning from a voyage to Australia as ship's surgeon. He graduated at Liverpool in 1938 and afterwards held resident posts at the David Lewis Northern Hospital and at Walton Hospital, Liverpool. He is the first casualty among the graduates of his year, many of whom are in the Services. His brother, Mr. W. S. Brindle, F.R.C.S., is at present serving as a major with the R.A.M.C.

Parliament

BEFORE rising for the Christmas recess Parliament transacted a considerable amount of useful business. Perhaps the most important item was the second reading debate on the War Damage Bill, an urgent measure which is designed to provide reasonable compensation for those whose property or goods are destroyed or damaged as a result of enemy action. Since the Weir Committee failed to make any recommendation to meet what was generally expected, sooner or later, to be a clamant need, there has been a widespread public demand that the Government should themselves take the matter in hand. The growing intensity of enemy air attacks on this country—and especially on London—in the past month or two has strengthened the case for immediate action. But unfortunately the complexities of the problem have been so great that much valuable time has been occupied in devising a workable scheme. Even now it is admitted that the scheme finally decided on is by no means logical or perfect. All that its authors claim for it is that it is the best that can be produced in existing circumstances as the result of long consultations with those best qualified to offer expert opinion on the knotty legal and insurance points involved. As such, the Government's plan met with general acceptance in the House of Commons. Criticisms were offered in plenty by members of all parties, but they were friendly criticisms, and everyone seems anxious that the measure should become law as quickly as possible.

The measure gives a general exemption from liability to contribution in respect of properties owned by charitable bodies, such as hospitals and almshouses, and charitable institutions for advancement of education, science or research will be charged only a third of the normal rate for the buildings they occupy. In the case of such charities the Chancellor of the Exchequer explained the right to compensation paid by the state will not be absolute, but the Government will confer with the authorities concerned with a view to reaching a reasonable solution of their difficulties and providing a fair settlement.

Compensation for Civilian War Injuries

In the House of Commons on Dec. 18 Sir Kingsley Wood made a statement indicating extensions of the personal war injuries scheme for civilians. He said the Government had decided to extend the disablement provisions of the Personal Injuries (Civilians) Scheme to include the whole adult population and not only those who were members of civil-defence organisations or were gainfully occupied. They would also increase the injury allowances (payments for temporary incapacity) under the scheme for all classes of gainfully occupied persons and unpaid civil-defence volunteers injured on duty so as to make them comparable with the maximum amount of compensation payable under the Workmen's Compensation Act. The injury allowances at present payable to civil-defence volunteers and gainfully occupied persons would therefore be increased to the following weekly rates:

	Not in hospital	In hospital
Married men	35*s.*	35*s.*
Single men	35*s.*	24*s.* 6*d.*
Women	28*s.*	17*s.* 6*d.*

The Minister of Pensions would have discretion to pay the higher rate to a single man or woman in hospital if he or she had been regularly maintaining a home for wholly dependent relatives. The following weekly rates would be payable to persons not gainfully occupied:

	Not in hospital	In hospital
Married men	21*s.*	10*s.* 6*d.*
Single men	21*s.*	10*s.* 6*d.*
Women	14*s.*	7*s.*

Pensions would be payable to persons of this class in respect of serious and prolonged disablement at rates similarly proportioned to the pensions of gainfully occupied persons.

In addition, the Government felt that special consideration was required for a widow in view of the immediate cessation of her husband's earnings and that provision should be made for the widow of a civilian worker or of a civil-defence volunteer comparable to the provision for a widow of a serving soldier. They had therefore decided that such a widow should be paid an inclusive allowance (where more favourable) of 50*s.* per week for the first ten weeks following her husband's death if he was killed by war injury or war-service injury or died whilst receiving injury allowance in respect of such injury. This provision would apply to the widow of an unpaid civil-defence volunteer killed on duty even though he was not a gainfully occupied person. Furthermore, they had decided that the funeral grant of £7 10*s.* 0*d.* which is now paid in respect of the privately arranged funeral of a civil-defence volunteer should be extended to the widow of a civilian worker. The Minister of Pensions would have discretion to pay the funeral grant in respect of a single man or woman to a wholly dependent relative for whom he or she had been regularly maintaining a home.

The Government considered that this scheme was preferable to a supplementary state insurance measure which had, moreover, many difficulties. It was not intended, however, to prejudice the rights of persons where the existing contract of service and conditions of employment provided for supplementation; neither did the Government see any objection to private persons effecting individual assurances with the insurance market, but they were opposed in principle to systems of group insurance against war risk.

Shelter Problems

Lord Horder met a committee of private members at the House of Commons on Dec. 17 to discuss health problems in connexion with air-raid shelters. Sir Francis Fremantle, who presided, invited Lord Horder to amplify various recommendations in the report of his committee recently published as a White Paper. There followed a long series of questions and it was decided to hold a further meeting for consideration of these matters after the Christmas recess.

QUESTION TIME

Lord Lothian's Death

Sir HENRY MORRIS-JONES asked the Under Secretary of State for Foreign Affairs whether he had received, from our embassy at Washington, a detailed account of the illness which caused the lamented sudden death of the Marquis of Lothian, our ambassador to the United States of America.—Mr. BUTLER replied: Yes, sir. According to accounts received from H.M. Embassy at Washington, Lord Lothian's death was due to toxic poisoning which affected his heart.

Diphtheria Toxoid for Practitioners

Major HEILGERS asked the Minister of Health if, in order to secure the immunisation of as many children as possible, as stated in Ministry of Health circular 2230, he could allow private practitioners to whom application was made by parents to receive supplies of diphtheria toxoid through the responsible medical officer of health.—Mr. MACDONALD replied: I am advised that the immunisation of children against diphtheria in the large numbers which I desire can be most expeditiously achieved by means of sessions at selected places where children can be assembled in convenient numbers. The free supply of material to local authorities is in a form convenient for this and not for distribution to private medical practitioners.

Immune Carriers

Mr. GROVES asked the Minister whether he had considered the danger of persons immunised against diphtheria and

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enteric fever becoming carriers of the germs of these diseases; and what steps he proposed to take to secure that these preventive expedients did not lead to an increased spread of the diseases in question.—Mr. MACDONALD replied: I am advised that when a majority of the child population have been immunised against diphtheria the danger will for all practical purposes disappear. There is no evidence that a community a portion of which has been immunised against enteric fever contains a greater proportion of carriers than one not so immunised.

Mobile First-aid Units

Replying to a question Mr. MACDONALD said: The average number of occasions on which a mobile first-aid unit has been sent to an incident in London during October and November is 4·4. In addition, the doctor, usually accompanied by a nurse, has been sent out without the rest of the unit on 5·3 occasions on the average, making a total of approximately 10. Up to the present these units have been used rather less than was expected, but their use, which has proved of great value, must of course depend upon the nature of the incidents. The nursing personnel are available to help in the work of the hospital or first-aid post on which the unit is based and to reinforce neighbouring first-aid posts when necessary.

Medical Officers in Air-raid Shelters

Mr. LINDSAY asked how many boroughs within the London region had now provided a medical officer in charge of shelters, a canteen or catering officer to supervise communal feeding, and a shelter welfare officer.—Mr. MACDONALD replied: 32 boroughs have made arrangements under which doctors are present in shelters all night, or pay regular visits, or are on call if required, the exact nature of the arrangements depending on the size of the shelter. 8 boroughs have appointed doctors to the staff of the M.O.H. to assist him in the regular inspection of shelters. The second part of the question is a matter for the Minister of Food, the third part for the Minister of Home Security; but I understand that an officer to deal with general shelter amenities, including food, has been appointed in 24 boroughs. As regards shelter welfare officers I am informed that whilst boroughs have not been required to appoint such officers one or two boroughs have done so.

Surgery Hours

Captain PLUGGE asked the Minister whether he was aware that panel doctors had, in many cases, made no attempt to adjust their consulting hours to black-out conditions and that in consequence very few insured persons attended evening surgeries; and what steps he proposed to take to remedy this.—Mr. MACDONALD replied: At the outbreak of war my department recommended insurance committees to review the arrangement of surgery hours, having regard to the restriction of lighting and other war conditions. I have no reason to think that there is, at the present time, any general dissatisfaction as to surgery hours, but I shall be glad to inquire into any complaint.

Protection of Panel Practices

In reply to a question Mr. MACDONALD said he understood that insurance medical practitioners who had suffered hardships by reason of air-raids were receiving every possible assistance from the insurance committees and their professional colleagues. Where his approval would be necessary to an extension of the Protection of Practices Scheme in operation in any area to cover practices which are in temporary abeyance as the result of air-raids, he would be prepared to consider the matter on application from the insurance committee.

Day Nurseries

In reply to Mr. THORNE, Mr. MACDONALD said the number of day nurseries established under the normal M. & C.W. arrangements before the war was 103. The average cost was estimated at 3*s.* per child per day, towards which the mothers were expected to contribute what they could afford. Most of these nurseries had been evacuated from the towns and had become residential homes. 23 day nurseries (with 995 places) for the young children of mothers who were munition workers had now been approved.

Protection against Typhoid

Mr. BROOKE asked the Minister whether he would make it possible for all persons who so desired to get themselves inoculated against typhoid fever free of charge or at a nominal cost.—Mr. MACDONALD replied: I have recently authorised all local authorities to provide free facilities for inoculation against fevers of the typhoid group, and I have arranged for supplies of the vaccine required for this purpose to be issued to the authorities at the cost of the Exchequer.

Fortified Flour

Mr. DE LA BÈRE asked the Parliamentary Secretary to the Ministry of Food whether he was now in a position to make some further statement regarding the Government proposals to introduce vitamin B1 into the bread supply to the public throughout the country.—Major LLOYD GEORGE replied: Yes, sir. An advisory committee, including scientists and representatives of the various trade and other interests involved, has been appointed for consultation on administrative and technical questions arising in connexion with the introduction of synthetic vitamin B_1 and calcium into white flour. The committee have held two meetings and made recommendations on numerous matters of principle and detail. At the same time negotiations have been proceeding with manufacturers and potential manufacturers of aneurin, with the result that I am able to confirm that it is expected that the distribution of fortified flour on a national scale will commence next spring.

In reply to a further question Major Lloyd George said that at the moment one commercial firm and one only was in a position to produce aneurin; other firms were getting ready.

Medical News

University of Cambridge

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B., B. CHIR.

Part I: surgery, midwifery and gynæcology.—P. H. Abbott, P. S. Barclay, R. F. Bates, R. I. S. Bayliss, S. L. Binderman, M. Q. Birkbeck, W. W. Brigden, W. R. Burkitt, A. E. Burns, D. Caddy, D. S. Cadman, W. E. Church, E. D. H. Cowen, D. Currie, R. Daley, J. O. W. Dick, J. P. Donnell, W. M. M. Douglass, J. R. Ellis, A. G. Farr, J. Foley, G. C. Franklin, R. B. Franks, E. H. M. Gillieson, N. Gillman, S. C. Gold, E. C. E. Golden, J. I. Hallinan, P. A. S. Hargrove, B. M. Heap, F. H. Howarth, A. D. Husband, G. T. James, M. D. King, A. Kinnier Wilson, E. F. Laidlaw, S. E. Large, A. G. Leishman, L. A. Little, J. F. Lucey, G. M. Lunn, F. N. Macnamara, O. D. Macnamara, W. D. Mail, A. E. de la Mallett, D. E. Marmion, R. Martlew, J. G. Mathewson, S. L. Melville, D. T. Milnes, J. N. Milnes, G. A. Mott, H. H. Nixon, J. F. North, M. S. M. Palmer, G. H. Parkinson, J. Perrin, M. T. Pheils, G. F. Purves, E. S. Reed, W. J. B. Rogers, K. B. Rooke, C. S. Savage, F. E. T. Scott, R. D. Scott, W. M. Scott, C. G. R. Sell, J. W. Shrimpton, A. W. Simmins, J. A. Smith, J. M. Stansfeld, G. O. Storey, W. H. Tattersall, J. G. Thurston, A. J. H. Tomlinson, A. B. Unwin, I. G. Wickes, A. H. Widdup, J. J. Wild, J. O. D. Williams, and W. B. Young.

University of Aberdeen

On Dec. 17 the following degrees were conferred:—

M.D.—*A. R. R. Cumming.

M.B., Ch.B.—J. C. Bowie, T. B. Davidson, D. A. Grant, E. S. Gray, E. G. Hendry, P. M. Jackson, M. O. C. Jones, A. W. McBain, Norman Menzies, William Slater, William Stewart, Peter Tytler, M. G. Valentine.

* Commended.

At a meeting of the Royal College of Surgeons of Edinburgh held recently with Dr. H. M. Traquair, the president, in the chair, the following were admitted to the fellowship:—

L. H. Aitken, M.B. N.Z., A. S. Dill-Russell, M.B. Lond., C. J. H. Gibson, M.B. Sydney, Conrad Latto, M.B. St. And., C. T. Moller, M.B. Witwatersrand, Elizabeth McCallum, M.B. Edin., G. D. McDowall, M.B. Edin., I. A. M. MacLeod, M.B. Edin., M. S. Nirankari, M.B. Punjab and Henry Wapshaw, M.B. Glasg.

Lieutenant D. A. Draffin, M.B. Belf., R.A.M.C., who was previously reported missing, is now reported prisoner of war.

The military cross has been awarded to Major W. D. Jackson, M.B. Edin., R.A.M.C., and Lieutenant M. T. Read, M.R.C.S., R.A.M.C.

The nursing recruitment centre, which was opened by the Fund in April at 21, Cavendish Square, W.1, has dealt with some 2000 inquiries on hospital training, and conditions and prospects in the nursing profession. Talks on nursing as a career were arranged at 16 schools, information on pre-nursing courses throughout the country has been compiled, and advertisements and articles have been placed in newspapers and periodicals. The matrons of the 85 hospitals in the Fund's area which are approved as training schools have coöperated in the work of the centre and some of the large teaching hospitals have referred to the centre candidates they were unable to accept. Some 300 candidates have been already placed by the centre.

Owing to war conditions the Industrial Health Education Society has resolved to wind up its work in arranging for talks on the requirements for industrial health. The work

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started in Scotland in 1927, a few years later it spread to England, and an average of 400 talks were arranged each year all over the country. At a meeting held in Edinburgh, it was resolved, that the remaining funds of the society should be handed over to the British Medical Association to establish a Mackenzie lectureship on industrial hygiene, called after Mr. James Mackenzie, who began the work and continued as organiser of the society.

The Margaret Ogilvie readership in ophthalmology in the University of Oxford which is held in conjunction with the post of senior surgeon at the Oxford Eye Hospital will be vacant on Sept. 30 next. The duties of the reader include original research and teaching. With the expansion of the Oxford medical school as a result of Lord Nuffield's benefaction, it may be expected that the scope of the readership both on the research and on the teaching side will be enlarged. It is understood that the board of electors proposes to advertise the vacancy early in 1941 and that full particulars will then be given, especially of the facilities for research which will be provided.

Since the course of training for midwives has been divided into two parts it has become apparent that, though the entries for the first part are satisfactory, there are not sufficient pupils taking the second part to maintain an adequate supply of practising midwives. Many nurses who wish to study midwifery but who do not intend to practise it take the first part, and in order to encourage more pupils to proceed to the second part of the course the Minister of Health is revising his system of grants to recognised training schools. In future all candidates entering for the second period of training will be eligible for a grant for the first period, and candidates who complete the second period will receive a grant without being asked to sign an undertaking to practise. As the grants are given to help the pupil midwives, the minister will not recognise a training school unless he is satisfied that the grants are being handed on to the pupils, either as salaries or as a reduction in fees.

King Edward's Hospital Fund has made a Christmas distribution of £300,000 to the London voluntary hospitals. This brings the total amount distributed by the Fund since its foundation in 1897 to over £10,000,000. Twenty-two additional hospitals will benefit from this year's distribution as the King's Fund area has been extended to cover the whole of the metropolitan police district.

The Ross Institute of Tropical Hygiene has returned to Keppel Street, Gower Street, London, W.C.1.

CORRIGENDUM.—In the annotation on sulphathiazole as a urinary antiseptic, on page 752 of THE LANCET of Dec. 14, the urinary concentrations found by Pool and Cook should have been given as ranging from 16·8 to 222 mg. per 100 c.cm.

Births, Marriages and Deaths

BIRTHS

BYNOE.—On Oct. 22, at Singapore, the wife of Dr. M. L. Bynoe, Malayan Medical Service—a son.

HADDEN.—On Dec. 18, at Bournemouth, the wife of Captain W. E. Hadden, M.B., the Nigeria Regt., seconded from Colonial Medical Service—a daughter.

HOLLINS.—On Dec. 18, at Lancaster, the wife of Dr. Charles Hollins, Colonial Medical Service—a son.

SCHULENBERG.—On Dec. 16, at Farningham, the wife of Mr. C. A. R. Schulenburg, F.R.C.S.—a daughter.

MARRIAGES

FRENCH—TAYLOR.—On Dec. 17, at Burgh Heath, Edward Brodie French, M.R.C.P., to Barbara Yvonne Taylor.

TAYLOR—LAUDER THOMSON.—On Dec. 19, in Edinburgh, Arthur W. Outram Taylor, M.B., Captain R.A.M.C., to Helena Scott Lauder Thomson, M.B.

TEMPLETON—MORGAN.—On Dec. 16, at Fairlight, Sussex, William Templeton, M.B., of Chichester, to Winifred Morgan.

DEATHS

COXWELL.—On Dec. 19, Charles Fillingham Coxwell, M.D. Camb., M.R.C.P., aged 83.

DELBRUCK.—On Dec. 15, at Newquay, Cornwall, Raoul Ernest Delbruck, M.B. Camb., of Cromwell Road, S.W.7.

GREY.—On Dec. 17, at Hexham, Northumberland, Thomas Campbell Grey, F.R.C.S., aged 73.

HENDERSON.—On Dec. 17, at Parkstone, William Savile Henderson, M.D., Lpool.

MARTINDELL.—In December, 1940, at Singapore, Ernest Walter Martindell, M.D. Lond., D.T.M. & H., D.R.C.O.G.

PROUDFOOT.—On Dec. 20, Frank Grégoire Proudfoot, M.A. St. And. & Oxfd, M.D. Edin., Colonel A.M.S., T.A., consulting obstetric physician to the Radcliffe Infirmary, Oxford, aged 71.

WALLACE.—On Dec. 16, William Wallace, M.D. Glasg., F.R.A.M., aged 80.

Notes, Comments and Abstracts

BOMBS OR HEALTH?

Mr. John Audric, headmaster of Brockham Green School, Surrey, writes: Education in the vulnerable areas such as the industrial north, certain south-coast towns and London, must be a serious business, and the imagination of directors of education and teachers has been tested to the full. There are, however, towns which so far have entirely escaped aerial attack. Others which have had bombs have not been singled out as a target, but have been damaged when an enemy pilot unloaded his bombs in an attempt to escape. But this has also happened in villages remote from any military target. Indeed, many have suffered more than their neighbouring urban areas. The town schools have shelters and use them; the village schools without shelters carry on hoping for the best, and rely on the protection to be found in corridors, under desks, or behind wired windows.

This winter promises to be severe, and in less dangerous urban areas there are too many schools with an over-developed siren-complex. The wail of the siren is the command for a rapid exodus from the warm classrooms and a procession to the shelters. These shelters were miserable enough in the summer; they are already many times worse, and will become more so as winter wears on, when the children will be forced to shiver in the cold and gloom. Many children do not have too liberal a breakfast, and worse, this meal may have been hasty, especially if it has followed or preceded a paper round. Others are not too strong, and were in pre-war days the regular habitués of their council's clinic.

Schools in the safer urban areas must choose between chance bombs or health. Today, very few shelters have heating installed; only a small number have efficient lighting and hurricane lamps must be used. Though safer than the school building they are not safe from a direct hit. At night they are used by the public, and many have been left in a disgusting condition. Infested bedding has been brought in, and people suffering from infectious diseases have been known to spend their evenings there. The ventilation problem has not yet been solved. These are the havens some children have to use whenever the siren wails.

On the educational side it is useless to pretend that much that is useful can be done. School magazines and journals bravely print photographs of classes in art, but one is inclined to be sceptical when it is remembered that the equipment used by the children has to be removed at night to allow the general public right of entry, and that if the children do leave their classrooms immediately the warning is sounded their progress to the shelter must indeed be leisurely if all the apparatus in the photographs is gathered up and taken down. I know of scores of schools where ever since war was declared whole sessions have been spent in shelters and yet not a bomb has fallen anywhere near them. What, then, is the balance-sheet of their educational achievement?

In the village schools which have often no greater immunity from attack than their neighbours in the towns, education has proceeded normally, and the health of the child has been unimpaired. The village boy or girl has already distinct advantages, both physical and academic, over his town neighbour.

To the present school population will fall the task of putting the world in order after this war, and they must not store up in their young bodies a legacy of ill health. Parents do not demand the elaborate security the teachers enforce. During holidays they allow their sons and daughters to go walking and shopping, even to the pictures, regardless of all the sirens in the locality. While no-one would dare to suggest that grave risks should be run by children in our established danger zones, the children of our less dangerous areas are paying too great a price for their safety in their daily processions to shelters.

Messrs. BAYER have produced their admirable diaries again this year, with a refill for each quarter and a full page for each day. In addition there is a section provided for brief entries called "Two Years at a Glance" which encourages one to make plans as far ahead as January 1943.

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DIPHTHERIA GRAVIS IN IRELAND

OUR Dublin correspondent writes: An interesting communication was made to the Royal Academy of Medicine in Ireland, at its meeting on Dec. 13, by Dr. C. J. McSWEENEY, medical superintendent of the Dublin Fever Hospital, and Dr. R. A. Q. O'MEARA, acting professor of bacteriology, Trinity College. On many occasions in recent years Dr. McSweeney had drawn attention to the high incidence in Dublin of a severe type of diphtheritic infection—diphtheria *gravis* or "hypertoxic diphtheria"—on the course of which the ordinary commercial antiserum had little effect. Over 100 deaths from diphtheria occur annually in Dublin, nearly all, Dr. McSweeney states, from this type of the disease. Dr. O'Meara had found that "Park Williams No. 8" toxin, which is used for the production of commercial serum, does not reproduce in animals anything comparable to what is found in severe clinical diphtheria in human beings. When, however, he added some toxin obtained from gravis strains in Dublin he was able to reproduce in animals conditions very closely resembling those found in severe diphtheria. Dr. O'Meara is of opinion that a serum, to be efficacious in the treatment of diphtheria gravis, must be rich in this second factor, which he calls "anti-B substance." He was able to obtain a small quantity of serum rich in this factor, and it was used on 16 cases of exceptionally severe hypertoxic diphtheria. Only one of these patients died, although the average mortality in cases of a similar type in recent years had been nearly 50%. The small number of cases in which the serum was employed was due to the fact that the supply of the serum was very limited, but even within these small numbers the result was dramatic. Dr. O'Meara will continue his researches, and hopes to be able to obtain a larger supply of this special serum, the effects of which he can then test on a more extensive field.

BUGS FOR THE MILLION

IF the popular demand for superficial knowledge on medical matters is to be met at all it is well that it should be met by experts. In "Man, Microbe and Malady" (Pelican Books. Pp. 218. 6*d*.) Dr. John Drew has undertaken the task for bacteriology, and, in a score of short but admirably lucid chapters, has covered much ground with remarkable thoroughness and accuracy. He describes and discusses the various types of pathogenic bacteria, how they invade human tissues and how they may be circumvented and destroyed. There are chapters on specific infections of the various systems, on resistance and immunity, and on water and milk as sources of human bacterial disease. The chapter on milk is of sufficient importance to warrant its publication and widespread distribution as a separate pamphlet. It should be rammed down the throat of every public-health authority. Especially topical and interesting is the chapter on the possible use of bacteria as a weapon of war. There is little to criticise but perhaps some will question the use of castor or olive oil as a dressing even for small burns. One of the best things about the book, which is illustrated with some impressive photomicrographs, is that the author has resisted the temptation to be hair-raising.

About 100 fully trained state-registered nurses have been allocated to various London boroughs for shelter work. More, either trained or auxiliary, have been supplied locally and the total available is now more than 300. The fully trained nurses receive an inclusive salary of 3 guineas a week. Hours of duty are approximately 96 a fortnight, involving alternate nights on duty while the hours of blackout are at their longest. Four part-time shelter matrons are being appointed by the Ministry of Health to visit and supervise the nursing personnel in the shelters in consultation with the medical officers.

The annual general meeting of the Ling Physical Education Association will be held at Hamilton House, Bidborough Street, London, W.C.1, on Wednesday, Jan. 8, at 11.30 A.M. After the meeting an address on the physical recreation directorate will be given by Miss P. C. Colson, organising secretary of the Central Council of Recreative Physical Training and one of the three members of the directorate. A demonstration of a new posture-recording apparatus by Mr. R. E. Roper, educational consultant, will also be given.

Appointments

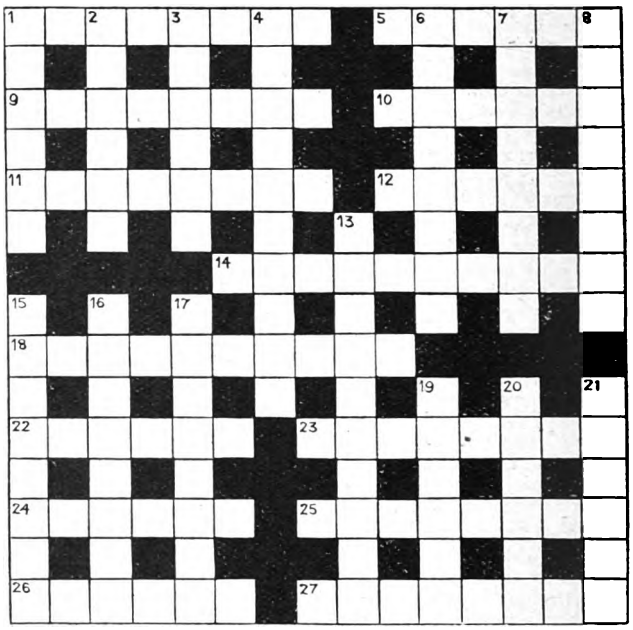
COVENEY, MARGARET F., M.B. Sheff., D.P.H.: temp. asst. M.O.H. and asst. school M.O. for Hendon.

GRIFFIN, JESSIE, M.B. Edin., D.P.H.: temp. asst. school M.O. for Middlesbrough.

LATCHMORE, A. J. C., M.S. Lond., F.R.C.S.: hon. asst. surgeon to Leeds General Infirmary.

WORNER, K. G. P., M.B. Melb., L.M.: temp. R.M.O. at Birch Hill Hospital, Rochdale.

LANCET CROSSWORD



ACROSS

1. Pride of the gangsters, and quite a swell (8).
5. Traveller's early morning greeting before the hot water was laid on? (6).
9. One of the battlefields for chemotherapy (8).
10. Man, proud man, can do it with his thumb (6).
11. Twelve a day (8).
12. Left after nine amputations (6).
14. Possibly certified (10).
18. A fresh command without end for the colonel, but just another diet for the diabetic (Two words, 3, 7).
22. Satan lost in a poetical measure (6).
23. In this you'll find Amy spilt (8).
24. In England now and then (6).
25. Stimulate among the physiologists (8).
26. A highlander shares his pupils with the policeman's son (6).
27. Where hydroxyl ions predominate (8).

DOWN

1. Not quite a spirited horse—woolly, in fact (6).
2. Fi! Omit it, and this is what remains of these hospital affairs (6).
3. The moon and a morsel of cyanide are responsible for this madness (6).
4. Transport with the bowling analysis is often the result of 11 across (10).
6. Tacked on at the end but often removed (8).
7. Transfusion experts cling to it; not I (8).
8. Beware of *Claviceps purpurea* here (Two words, 3, 5).
13. Of a sea delirium where all is mixed with a centaur (10).
15. Water, water everywhere, or so the patient thinks (8).
16. Accompanies the crisis (8).
17. Found in the pyramidal layer of the cortex (Two words, 4, 4).
19. As the Latin has it, salt upon the broken road is fluid (6).
20. It and the rest in Rome turn back.
21. This Frenchman knew Watt was watt (6).

LAST WEEK'S SOLUTION

E	P	I	D	E	M	I	C		W	E	B	B	E	D
M		N		M		S				C		E		I
E	L	D	R	I	T	C	H		R	H	O	D	E	S
T		I		T		H		H		O		S		S
I	N	T	E	S	T	I	N	E		L	O	O	S	E
C		E			U		A		A		R		C	
			D	R	U	M		D	I	L	U	E	N	T
M		B		E					I		S		S	
C	H	A	R	C	O	T		O	R	A	L			
B		C		U		O		E				S		P
U	T	T	E	R		E	S	S	E	N	T	I	A	L
R		E		R		S		T		O		L		A
N	E	R	V	E	S		D	R	E	S	S	I	N	G
E		I		N				I		E		C		U
Y	E	A	S	T	Y		I	N	C	R	E	A	S	E

Here is WHO'S WHO again, fatter and stronger;
More folk are famous, or else they live longer.
In honours, degrees and attainments so rich
That only the publisher knows which is which.
(93rd issue, 1941, Adam & Charles Black. 65*s*.)

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REFERENCES AND ABBREVIATIONS

Readers in search of a given subject will find it useful to bear in mind that the references are in several cases distributed under two or more separate but nearly synonymous headings. Institutions and Corporations with the right to the prefix Royal will be found under that prefix, with the exception of Hospitals, which will be found under that heading; and Medical Societies, which are separately indexed under Societies. All Universities are indexed under the word University. (*A*) = *Annotation*, (*C*) = *Correspondence*, (*LA*) = *Leading Article*, (*ML*) = *Medico-legal*, (*NI*) = *New Invention*, (*O*) = *Obituary*, (*P*) = *Parliament*, (*PCP*) = *Panel and Contract Practice and* (*R*) = *Review*.

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